DOCUMENT RESUME

ED 071 267 EC 050 875

TITLE	Me and My Environment. Unit IV: Transfer and Cycling of Materials in My Environment.
INSTITUTION	Biological Sciences Curriculum Study, Boulder, Colo.
SPONS AGENCY	Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
PUB DATE	72
NOTE	274p.
EDRS PRICE	MF-$0.65 HC-$9.87
DESCRIPTORS	Biology; *Class Activities; *Curriculum Guides; *Educable Mentally Handicapped; *Environmental Influences; *Exceptional Child Education; Guidelines; Inquiry Training; Instructional Materials; Lesson Plans; Mentally Handicapped; Problem Solving; Student Behavior

ABSTRACT

Presented is the experimental edition of Unit IV: Transfer and Cycling of Materials in My Environment, which consists of 29 life science curriculum activities intended for the 13-to-15-year-old educable mentally retarded child. The curriculum guide is being used in the final field test prior to revision. Stressed throughout the program are ecological themes, inquiry skills, problem solving skills, environmental elements, and applicational behaviors and attitudes. Eight to 12 activities for each of the three core study areas within Unit IV are given of which the following are examples: plant and animal hunt, making a pill bug habitat, the hamburger lab, garbage, and planting in compost. Activities are organized into materials, teaching strategies, and anticipated student behaviors. The three cores consider energy and material transfer, decomposers in the environment, and garbage and the environment respectively. The ecological theme developed is the cyclic nature of processes, the inquiry skill seen to be developed is guessing and applying. Two problem solving skills emphasized are identifying controls and drawing conclusions. The environmental element considered is air. A desired behavior outcome is skill in personal body care. (For related curriculum guides see EC 050 871 through EC 050 874.) (DB)

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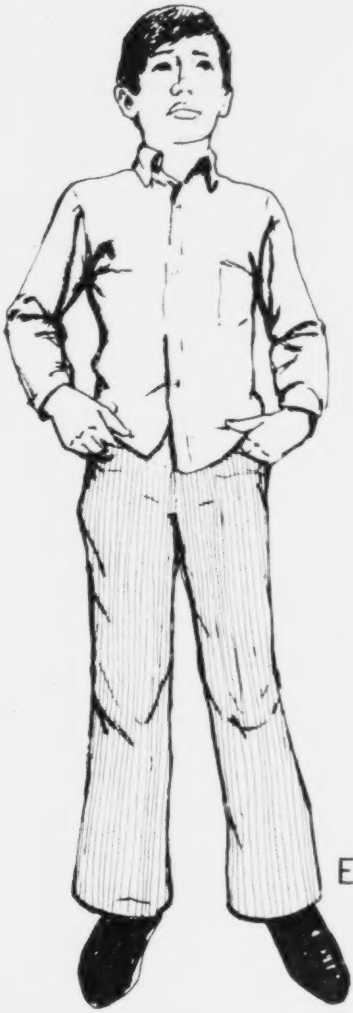

Experimental Edition 1972 - 1973

Unit IV:
Transfer a
# of Materia

Biological Sciences Curriculum Study

Unit IV:
Transfer and Cycling of Materials in My Environment

1972 - 1973

Me and my Environment

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Me and my Environment

INTRODUCTION

The project to develop a life science curriculum for the educable mentally handicapped (EMH) was originally funded in the summer of 1969 by the Division of Research, Bureau of Education for the Handicapped, United States Office of Education. The project is charged with writing, field testing, evaluating, and disseminating materials dealing with topics in life sciences for the EMH population in our schools.

ME NOW, the BSCS model life science program for educable mentally handicapped youngsters in the 11- through 13-year age-group, has been released and is available from Hubbard Scientific Company of Northbrook, Illinois.

On the basis of the success of the ME NOW program, and in anticipation of meeting further student and instructor needs, the Bureau of Education for the Handicapped has provided the BSCS with a three-year continuation grant to develop model materials for 13- to 15-year-old EMH students. Recognition by the educational community of the need for special emphasis on matters of ecological concern led the BSCS staff to decide early in the project that a
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In May 1971, a plannin
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Summer, 1971 - Initial writing conference

1971-72 academic year - Initial testing

Summer, 1972 - Revision

1972-73 academic year - Large-scale f

Summer, 1973 - Revision

1973-74 academic year - Conclusio

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portion of the materials for EMH students should focus on environmental studies. The time line for developing this new curriculum, which is entitled ME AND MY ENVIRONMENT, is shown below.

In May 1971, a planning conference was held to prepare guidelines for the development of ME AND MY ENVIRONMENT. The conference was attended by the five members of the advisory committee, four of whom are in the field of special education and the fifth is in biology; the project writing team consisting of five special education teachers and five biology teachers; and the BSCS project staff. Conferees developed guidelines covering areas of environmental concern and utility for the target population of children, the characteristics of this population, and the needs of these children that might be met through environmental studies. A multidimensional model incorporating the science content, cognitive and affective behaviors, ecological themes, contextual focus, and needs of the children resulted from the planning conference. Following the conference, the BSCS project staff prepared a proposed content and objective outline for the curriculum. A thorough study was made of the existing literature covering the physical, social, and psychological needs of handicapped adults; the staff then attempted to identify which of those needs might be met by ME AND MY ENVIRONMENT.

Summer, 1971 - Initial writing conference

1971-72 academic year - Initial testing

Summer, 1972 - Revision

1972-73 academic year - Large-scale field test

Summer, 1973 - Revision

1973-74 academic year - Conclusion of field test

Me and my
Environment

THE ROLE OF THE TEACHER IN THIS EXPERIMENTAL EDITION

This curriculum has been written by teachers; it will be tested and modified by teachers. BSCS has a enthusiastic teachers for this development, testing, and modification. Ten of these teachers served a more were selected as experimental teachers to provide the best possible initial field test of the cu feedback for the revision depends heavily upon the resourcefulness of these teachers. This means tha including:

1. Implementing the strategies and activities exactly as they have been written. Only when the comb curriculum as prescribed are analyzed can its strengths and weaknesses be revealed.

2. Developing a feel for the inquiry strategy, flow of activities, and ultimate student behaviors ar this understanding of the rationale of this program, the test teachers must suggest extensions of invent yet others as needed that would enable their students to achieve the objectives when the s

3. Providing timely, accurate, and detailed feedback specifying strengths and weaknesses, modificati activity.

4. Contributing to the actual writing of the curriculum in a few of the open-ended situations. We p at spots where we have given you the opportunity to develop a portion of an activity in depth. N but it will enable us to identify potential writers among the group of test teachers.

The following outline will provide you with an overview of the major components of the program:

	Ecological Themes	Inquiry Skills	Problem Solving Skills	E
UNIT I. EXPLORING MY ENVIRONMENT	Interrelationships Of Environmental Components	Observing	Experimenting	Spa
Sensing My Environment Investigating My Environment Landmarks In My Environment		Identifying	Knowing What The Problem Is And What To Do To Solve It	She

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will be tested and modified by teachers. BSCS has attempted to find highly skilled, flexible, and
ing, and modification. Ten of these teachers served as writers to create the materials. Fourteen
rovide the best possible initial field test of the curriculum. The success of this test in providing
he resourcefulness of these teachers. This means that the test teachers have several responsibilities,

xactly as they have been written. Only when the combined results of all teachers' use of this
s strengths and weaknesses be revealed.

flow of activities, and ultimate student behaviors around which the curriculum is organized. Through
program, the test teachers must suggest extensions of some activities, modifications of others, and
 their students to achieve the objectives when the specified strategies are inadequate.

dback specifying strengths and weaknesses, modifications, alternatives, and student responses for each

rriculum in a few of the open-ended situations. We purposely have provided blank pages in the manual
nity to develop a portion of an activity in depth. Not only will this give ideas to the future writers,
riters among the group of test teachers.

verview of the major components of the program:

es	Inquiry Skills	Problem Solving Skills	Environmental Elements	Applicational Behaviors And Attitudes
Of nents	Observing	Experimenting	Space	The student develops:
				--a sense of self-identity.
	Identifying	Knowing What The Problem Is And What To Do To Solve It		--a success syndrome.
			Shelter	--an attitude of inquiry.

Me and my Environment

	Ecological Themes	Inquiry Skills	Problem Solving Skills	Env E
UNIT II. ME AS A HABITAT	Diversity And Pattern	Associating	Recording Data	
Microbes And Me				
Disease In People Habitats				
Environmental Choices And Chances (Drugs, Alcohol, Smoking)		Describing	Discussion And Treatment Of Group Data	Livi (P (A (M
	Complementarity Of Organisms And Environment	Comparing	Organizing Data	
UNIT III. ENERGY RELATIONSHIPS IN MY ENVIRONMENT		Translating	Explaining, Defending, Answering Why Questions	
Introduction To Energy				
Energy In Food				Ener (F
Energy Flow Through Food Chains And Webs			Asking Questions	
Food Making In Plants	Flow Of Energy	Inferring		
			Identifying Variables	
UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT		Applying	Identifying Controls	Air
	Cyclic Nature Of Processes	Guessing	Interpreting Results	
Energy And Material Transfer				
Decomposers In My Environment				
Garbage And My Environment			Drawing Conclusions	

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	Inquiry Skills	Problem Solving Skills	Environmental Elements	Applicational Behaviors And Attitudes
n	Associating	Recording Data		--skills in functional, receptive, and expressive communication about his environment.
	Describing	Discussion And Treatment Of Group Data	Living Things (Plants) (Animals) (Microorganisms)	--skills in recognizing environmental landmarks and utilizing these for orientation and mobility.
n-	Comparing	Organizing Data		
	Translating	Explaining, Defending, Answering Why Questions		--a recognition of his social dependence on others and his biological dependence on the environment.
	Inferring	Asking Questions	Energy (Food Chains)	--an understanding of the interrelationships between environmental components.
	Applying	Identifying Variables		--skills in employing systematic problem-solving techniques to persistent problems of daily life.
		Identifying Controls	Air	
	Guessing	Interpreting Results		--skills in hygienic personal body care.
		Drawing Conclusions		--skills in the selection, preparation, and storage of food.

Me and my Environment

	Ecological Themes	Inquiry Skills	Problem Solving Skills	En
UNIT V. POPULATIONS AND SOCIETIES	Finiteness Of Resources	Speculating	Recognizing Problems And Formulating Questions	Wat
Behavior Within Different Social Levels		Predicting		
Population Size And Complexity			Designing Experiments	
Behavior And Population Density	Population Dynamics			Man
Population Size And Resource Use				
Population Growth				
	Ecological Trade-Off			

SOME GENERAL OBJECTIVES

1. To help the mentally handicapped child develop interests, skills, and positive attitudes through experiences with scientific -- especially biological -- concepts.

2. To provide the mentally handicapped child with challenging intellectual activity at a level commensurate with his ability to respond effectively.

3. To aid the child
heightened observ
measure of self-c
for his environme

4. To contribute to
social maturity a

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s	Inquiry Skills	Problem Solving Skills	Environmental Elements	Applicational Behaviors And Attitudes
rces	Speculating	Recognizing Problems And Formulating Questions	Water	--an attitude of self-concern, as well as social concern, related to his environment.
	Predicting	Designing Experiments	Man	--skills in making independent decisions that relate to the quality of his environment.
				--a feeling of competence in dealing with his environment.
				--a basis for aesthetic appreciation.
f				--skill that may lead to a hobby or avocation over a lifetime.
				--an attitude about and concern for overcrowding and its social and personal implications.

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3. To aid the child in establishing functional modes of living through heightened observation, a well-developed curiosity, an increased measure of self-confidence, and a sense of responsibility to and for his environment.

4. To contribute to the development in the child of a higher level of social maturity and emotional stability that can lead to increased

vocational proficiency, realistic self-concept, creative self-expression, and more effective assimilation into the community.

5. To develop in the child a knowledge of himself in relation to his environment, along with a tendency to apply this knowledge to the tasks of everyday living.

6. To contribute to increased knowledge about the learning characteristics and limitations of the educable mentally handicapped pupil, and about effective strategies for instruction.

BASIC ASSUMPTIONS UNDERLYING THE DESIGN FOR THE CURRICULUM MATERIALS

In the initial discussions with the special education community, some basic assumptions for the development of the life science materials were identified. These were revised somewhat, based on the development and testing of ME NOW, to form the underlying assumptions for the development of ME AND MY ENVIRONMENT.

1. Ideas must be developed with a minimum of reading on the part of the student.

2. Vocabulary, where possible, should involve functional rather than technical language, although technical names are taught when these may be useful to the student.

3. Entry points should be concerned with concrete, tangible "things," rather than with abstract, intangible ideas or concepts.

4. The classroom environment and the materials should not be cluttered with distractors; however, a variety of perceptual modes and instructional media should be used (e.g., sight, touch, smell, etc.).

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5. Activities should be developed in small, discrete units that build on or reinforce a concept or skill.

6. Learning, for the EMH student, requires slower pacing, greater redundancy, and time for participation by each student. The instructional materials should be student-doing rather than student-watching.

7. An activity must involve the student in ways of applying the desired behavior; transfer cannot be assumed.

8. EMH children need and can respond effectively to an activity-oriented instructional approach.

9. The curriculum should be designed to provide students with an experience in science as inquiry, through the exploration of their environment.

10. Most teachers of the Educable Mentally Handicapped will need specific directions in using inquiry strategies for teaching science concepts.

11. The teachers of the Educable Mentally Handicapped, for the most part, are not science-oriented; therefore, the materials should be specific with regard to science techniques.

12. The materials and methods must allow for attention to individual differences and to specific learning characteristics of the population.

13. To achieve the objectives, designers of the materials should attempt to create a balance between detail and motivation; that is, the amount of minute and abstract detail that can be learned is probably a function of the interest and motivation that can be established to deal with it.

MAJOR AIMS FOR ME AND MY ENVIRONMENT, A JUNIOR HIGH EMH SCIENCE CURRICULUM

The curriculum includes instruction related to the personal well-being, self-worth, confidence, and successful coping of each person to meet persistent daily life problems. The major aims are:

1. Development in each child of a sense of identity as a person who has some degree of control over and can act on his environment. This will lead to a degree of self-determination based on a rational coping with situations rather on a passive compliance or an impulsive response to problems.

2. Development in each child of a success syndrome. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility - almost obligation - to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. As a group, the students should help each individual fit what he has done into a pattern of accomplishment.

The curriculum is intended to be intellectually stimulating, and exploratory for each student, and to induce him to become actively involved. It should encourage the following outcome:

3. Development in each child of an interest that could become a hobby or avocation over a lifetime (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.

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The curriculum is organized around eight ecological themes. There are some specific content objectives related to these. The ultimate objectives are:

4. Development in each child of a sense of relationship and empathy with other living things. It is hoped this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.

5. Development in each child of an understanding of environmental conditions that will lead to a sense of responsibility for the environment and actions that protect or improve it.

These are the five overriding aims that should serve as reference points for teachers and guide much of what they plan and do in the classroom. A junior high student in one of the first classes that tested these materials expressed what is needed this way: "I just feel that if we want these kids to improve, and that's the whole idea of it, you have to bring these kids a certain amount of happiness. You have got to make them feel that they are really wanted. If they are wanted, they will try a little harder. That sounds kind of childish, I suppose, but it works...Another thing...always inspire: 'Come on, put your best foot down -- try it again.' You know, things like that. I mean, to me, just the tone of voice makes a difference to me about going out or staying in this class. I just feel that they don't want me -- And they don't, (when their tone says) 'Oh, Eddie! Why did he have to come today?'"

ECOLOGICAL THEMES

Since the original planning conference for the development of ME AND MY ENVIRONMENT, eight ecological themes have emerged which seem to encompass the major ideas and concepts (i.e., the science content) that the curriculum development team sees as appropriate for this student population. These themes are broad generalizations, some understanding of which appears to be a prerequisite for coping with one's own environment as well as with society's environmental problems. The themes are probably best thought of as unifying threads which run throughout the curriculum.

1. INTERRELATIONSHIPS OF ENVIRONMENTAL COMPONENTS.

> "When we try to pick out anything by itself, we find it hitched to everything else in the universe." -John Muir

Life is entirely dependent upon the things that the environment supplies: air, water, food, shelter, and subtle things such as a suitable temperature and humidity. Animals depend upon other animals or plants for food. Scavengers (carrion and detritus feeders) and decomposers (bacteria and fungi) obtain their nutrition from the remains of living organisms. Green plants depend upon sunlight, air, water, and minerals from their environment and form the base upon which all organisms are interconnected by food chains and complex food webs.

Organisms interact with each other, and with the environment, in a variety of ways in addition to the eater-eaten relationships of food chains or webs. Plants compete with each other for light, water, soil nutrients, and growing space. Animals compete for available food resources, space, and shelter. Other relationships include parasite-host and pathogen-host interactions.

The important consequence of this theme is that actions are not singular, nor do they have singular impact. Man's competitive interactions have far-reaching, often unknown consequences. For example, clearing land for raising agricultural crops destroys the habitat for plants and animals and disrupts certain food webs, while establishing suitable habitat for agricultural species. The resulting monocultures are often vulnerable to attack by pests because populations of natural predators
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of natural predators have been removed. Attempts to control these competitive organisms through applications of pesticides may simply exacerbate the situation by killing nontarget organisms such as predators, scavengers, and decomposers which are actually beneficial. Similarly, herbicides used in control of weeds which are competing with crops may destroy habitats for natural predators, making additional applications of insecticides necessary; these in turn may kill more nontarget beneficial organisms. Numerous studies have shown that large-scale, indiscriminate use of pesticides may, in the long run, actually decrease agricultural productivity. In addition, manufacture, transport, and application of pesticides and fertilizers contribute to air and water pollution, thereby adding to the degradation of vital resources upon which all life depends. This is but one simple example of a myriad possibilities. If we expect students to start thinking in terms of consequences, it is imperative that they realize and appreciate that life depends upon interrelationships and that apparently simple actions may have far-reaching implications.

2. DIVERSITY AND PATTERN.

There is great diversity in the environment. Differences in climate and topography generate different environments made up of different communities of plants and animals. Plants and animals differ as they are adapted to perform different functions. Even within a species there is diversity. But, it is possible to find patterns within that diversity. Recognizing patterns helps one conceptualize and understand the functioning and interrelationships of all environmental elements within the biosphere.

If one looks at the organisms in any habitat, he discovers a variety of sizes, shapes, and colors. Further examination will reveal groups of organisms that are related in various ways, e.g. some produce food (producers) while others feed upon these producers (consumers). We find that the organisms are all related in a pattern forming a food web.

Diversity is thought to enhance the stability of a system, for it provides alternate channels of energy or materials flow if part of the system is lost or overburdened. For example, consider a single food chain: plants, grasshoppers, frogs, snakes. If one link in the chain is lost, e.g. the grasshoppers are wiped out by insecticides, all links beyond that one will also be lost if they have no alternative sources of food. In a complex food web, however, a link may be lost without destroying the system; links beyond the missing one may turn to another channel for food (e.g., the frogs may exploit another type of insect food resource). Thus, preserving diversity may be necessary in preserving the stability of the life support system of the biosphere. Man cannot exist alone.

It is often said that variety is the spice of life. Diversity makes the environment less monotonous and more interesting. This aesthetic component should receive emphasis in the curriculum.

3. COMPLEMENTARITY OF ORGANISMS AND ENVIRONMENT.

A complement is something that completes or fills out something. Complementarity in this context refers to the completion brought about by interrelationships which are dependent upon one another. A few examples should clarify the meaning of this theme.

Organisms use material things from the environment and, in turn recycle things to the environment which may be used by other organisms. Thus, the presence of organisms modifies the environment in various ways, some of which make the environment more suitable for other organisms. Plants use carbon dioxide and release more oxygen than they use. Consumer

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organisms (animals, decomposers) use oxygen and release carbon dioxide. Both the producers and consumers are dependent upon the environment for these resources, and the balance of these materials in the environment is likewise dependent upon both groups of organisms.

Without scavengers and decomposers there would be a prodigious accumulation of the remains of once living organisms cluttering up the environment. Probably all of the available carbon, oxygen, and other essential elements would be tied up in these dead remains. Life would have come to a screeching halt a long time ago!

The presence of plants improves the water-holding capacity of a watershed and helps prevent erosion of the soil by wind and water. Plants reduce the rate of evaporation of soil water but at the same time release it to the atmosphere. Thus, plants play a vital role in the water cycle and influence local climates through the regulated flow.

Plant succession is a classic example of complementarity. An abandoned field, new roadside, or similar disturbed area is quickly invaded by hardy pioneer plants which we usually think of as weeds. As these grow, die, and decay, they modify the immediate environment and are replaced by plants which are better adapted to the new conditions. These, in turn, cause further modifications and are replaced by other populations; finally a relatively stable community exists that is able to replace itself and that is in dynamic equilibrium with the environment. Such communities are usually referred to as climax communities.

4. FLOW OF ENERGY

> "The biotic stream is capable of flowing in long or short circuits, rapidly or slowly, uniformly or in spurts, in declining or ascending volume. Ecology calls this sequence of stages in the transmission of energy a food chain, but it

can be more accurately envisioned as a pipe line---(which) leaks at every joint." -Aldo Leopold.

Energy may be defined as the capacity to do work. To cause movement requires energy; indeed, to do anything requires energy. Life depends upon this continuous flow which is initiated by a constant input of energy from the sun, its photosynthetic transformation from light to chemical energy by the producer organisms (green plants), its passage from organism to organism along various food chains, and its eventual loss as radiant heat to outer space. Each time that energy is converted or transformed at each step along the way, some of it is lost from the system and is no longer available to do useful work. This, in simple terms, is the second law of thermodynamics. Green plants are able to fix photosynthetically only a portion of the sun's energy that they intercept. In turn, some of the energy which they trap and store is used by the plants for such things as growth, reproduction, and the movement of materials. Thus, only a portion of that original stored energy is available to the organisms which eat the plants. These organisms likewise use energy in their various life processes so that only a small portion of the energy which they received from eating plants is available to their predators. As a consequence, only about one-tenth of the energy at any step in a food chain is available to the next level. An acre of agricultural land will provide enough food energy for about 1.5 persons for a year if planted in wheat, but will feed only 0.1 person if used to raise beef cattle!

Society's use of fossil fuels is simply a utilization of energy captured and stored over millions of years by green plants. As such, this source of energy is in finite supply and is a nonrenewable resource. Electricity generated by fossil-fuel burning plants can similarly be traced to the sun. Hydroelectric plants offer a limited alternative source of
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alternative source of electricity. This source is also finite because of the limited number of adequate sites. The use of nuclear reactors (which is simply a duplication on earth of the natural processes taking place on the sun to release energy) to generate electricity offers an alternative source of energy for society; this source, however, as are all others, is governed by the laws of thermodynamics. The energy, once released, flows through the system and is eventually lost to space as heat. This source is also finite, but refinements in the technology of the breeder reactor may make it a very large source. The exploitation of nuclear energy is fraught with unanswered questions and problems. How can we safely dispose of the radioactive wastes generated? Can the earth dissipate the huge amounts of waste heat generated? What effects will this heat have on climates, ecosystems, organisms?

It should be emphasized that nuclear energy offers little hope, at present, of replacing the sun as a life-supporting source of energy. In the forseeable future, man's only source of food energy will be the sun, through photosynthesis of green plants.

5. CYCLIC NATURE OF PROCESSES.

> "All the rivers run into the sea, yet the sea is not full."
> -King Solomon

In contrast to energy, materials (matter) are continuously cycled from living to nonliving systems. Materials necessary for life are in finite supply, and if they were not constantly cycled, life would simply run out of resources and cease. Some examples include the water cycle, the carbon dioxide-oxygen cycle, the nitrogen cycle, and the cycling of various essential minerals such as calcium, potassium, sulfur, and magnesium. Decomposer organisms play a most vital role in many of these cycles, releasing materials which have been incorporated into living organisms so that they are once again available to other organisms in the environment.

Man's present exploitation of consumable resources, in most cases, upsets these natural cycles. The manufacture and ultimate discarding of nonbiodegradable products removes important elements and compounds from the natural cyclic processes of the ecosphere and could ultimately lead to the exhaustion of such resources for the life support system. Burning of fossil fuels is changing the natural balance of oxygen and carbon dioxide in the atmosphere, with the consequences largely unknown. Degradation of air and water through pollution and the application of pesticides destroys organisms which are vital to cyclic processes.

6. FINITENESS OF RESOURCES.

To paraphrase Barry Commoner: Everything has to come from somewhere. The earth has been likened to a spaceship because of its finite supply of all material resources. Inasmuch as life depends upon a continued supply of resources, things have to be used over and over. Continued exploitation of any resource will lead to its exhaustion unless that resource is recycled. The demands of today's technological societies are placing tremendous burdens on the earth's resources and, at the same time, the wastes generated are making other resources unavailable or unfit for supporting life. Projections indicate that we will have depleted our supply of fossil fuels and several important metals resources early in the next century.

Through photosynthesis, food is a renewable resource so long as the natural cycles are able to resupply the raw materials necessary, and so long as environmental conditions necessary for plant life are maintained. But, the amount of food that can be produced on the earth at any one time is finite! There is only so much area available, only so much sunlight that can be intercepted, and only so much of the required raw materials available.

The consequence of this theme is that an indefinite continuation of growth and an increasing use of resources is impossible when the supply of all resources is
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of all resources is finite. This is true of population, food consumption, resource utilization, technology, gross national product, or any other parameter which one chooses to measure. And all noteworthy predictions indicate that we are very rapidly reaching the limits of growth. Most of us will probably experience the dire consequences!

7. POPULATION DYNAMICS.

A population refers to a collection of individuals of the same species occupying a given space at a given time. The size of living populations is determined by four factors: rate of birth, rate of death, rate of immigration, and rate of emigration. Populations tend to grow geometrically (e.g., 2, 4, 8, 16, 32,...) to the limit (carrying capacity) of their environment as determined by the available food, space, predation, and disease. They then either level off and exist in some fluctuating equilibrium with other populations, or they crash back to some low level. A common misconception is that all biological populations tend to follow the first pattern: growth which is described by an S-shaped curve up to the carrying capacity, followed by a fluctuating equilibrium. There are, however, many biological populations which dramatically overshoot the carrying capacity of their environment and, as resources are rapidly depleted, crash back to a low population level. A blowfly population is a good example of the latter. Upon arrival at a carcass, the population increases rapidly, completely overshooting the carrying capacity or the environment's capacity to sustain the population for any appreciable length of time. As the food resource is quickly depleted, the population crashes back to the low level of a few adult flies who are searching out a new carcass to feed upon.

The strategy is simple -- exploit the environment for all it's worth while it is here and hope that a few of the many adults produced in the process will survive long enough to make it to the next carcass. There is evidence that the characteristics of human population growth are similar to those described for the blowfly, and our present exploitation of the earth's resources is certainly analogous to the strategy employed by the blowfly. While such a strategy may be sound for organisms like the blowfly, it certainly would be disastrous for mankind. The earth is the only carcass that we have.

Since resources are finite, no population can continue to grow forever. The human population has grown geometrically over the past few centuries. Doubling time of the human population is currently less than 35 years, and the most optimistic estimates indicate that this population will exceed the carrying capacity of earth within a century (some suggest that we have already passed the carrying capacity and many demographers and ecologists have predicted a crash in the human population prior to the year 2020). Population control and zero population growth will be accomplished, either by self-imposed means or by natural means. If the latter, it will occur through starvation, disease, war, or lower fecundity. There are no other plausible alternatives!

Perhaps the greatest service that this curriculum could hope to perform is to help this population of youngsters understand the implications of population growth and the necessity for limiting family size. But, to achieve the desired end, the curriculum must provide the students with an understanding of the ways and means by which family size may be controlled. This is one area where individuals can make decisions, can have an influence, and can contribute to the solution of what may be mankind's most pressing problem!

8. ECOLOGICAL TRADE-OFFS.

"Every coin has two sides."

As we have seen, all environmental components are interrelated in intricate, complex ways. No action has singular impact, and thus any course of action must be carefully weighed and alternatives considered. Any course of action involves ecological trade-offs.

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For example, consider society's use of electricity. Many of us enjoy a life style which is very closely tied to the conveniences and labor-saving devices powered by electricity. The generation of that electricity is a major factor in environmental degradation. By and large, we have made the decision to forego a certain amount of environmental quality to enjoy the leisure and convenience of electrical appliances. Projections indicate that increases in demand for electrical power will require strip mining vast areas of Wyoming and Montana, exploiting oil shale reserves of Colorado, depleting the petroleum reserves of the Alaskan north slope (with the inherent dangers to the arctic tundra), and constructing large numbers of nuclear power plants. In all of these activities, we will trade off various amounts of environmental quality.

INQUIRY PHILOSOPHY

We do not view science as a collection of facts, but as a process by which facts are gathered, interpreted, and organized into conceptual schemes. We have included facts, and activities structured to generate facts, not for their intrinsic value but to provide the means through which concepts and generalizations are developed through an inquiry strategy.

Inquiry, simply defined, is finding out why. Inquiry may be defined as a process of questioning, of seeking information, of discovering. For EMH students, as for others, the excitement of discovery adds meaning to learning. Inquiry allows the student a natural avenue for satisfying his curiosity about his world. An inquiry strategy is one which poses a question or problem and then guides students through inquiring kinds of behaviors such as observing, describing, identifying, comparing, associating, inferring, applying, predicting, translating, guessing, speculating, creative thinking (divergent production), and value judging.

There are degrees of inquiry. On one end of the scale, a question is posed and the student, after analyzing the question and applying his experiences and background information, answers the question. At the other extreme, the student poses the question after being given a certain amount of background information, and then proceeds to answer the question after being given a certain amount of background information, and then proceeds to answer the question by designing an experiment, conducting the experiment, and interpreting the results.

All degrees of inquiry have a common ingredient: the answer is not given; it is arrived at by the individual after he has analyzed information relevant to the question. The distinction is obvious -- in inquiry strategies the questions are answered by the students and not the instructor.

If knowledge is acquired, at least in part, through an inquiry strategy, then the student should be able to use that strategy in acquiring further information and solving future problems as they arise.

It is assumed that after completion of the curriculum, the student will ask questions that emerge through the interaction of environmental inputs with the experiences we have provided. He will be more able to seek answers to these questions through his ability to acquire and interpret information.

INQUIRY SKILLS

1. OBSERVING is a fundamental activity of scientists. The accumulation of information which may lead to knowledge comes primarily from what we see, hear, taste, smell, or touch. A major function of this curriculum should be to offer a rich and varied environment of concrete experiences for the students. As students gain experience, accuracy in observing and recording the details of their findings should be increased. Observing should frequently

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2. IDENTIFYING involves the recognition of what something is or of certain properties that make it possible to categorize the thing. This includes the determination and/or matching of a name or definition, the use of a key or guide, or the recall of a label from previous experience.

3. ASSOCIATING involves seeing what things go together -- seeing relationships or recognizing common properties. Associating may be thought of as a prerequisite to classifying, or organizing data or information for some purpose. Grouping (classifying), through associating, may enhance conceptualizing.

4. DESCRIBING involves writing or verbalizing orally all of the relevant observations about a thing so that another individual would be able to use the description to identify the object or share in an event he did not actually experience. Emphasizing description should enhance development of observational skills.

5. COMPARING involves the inspection of two or more objects (events) to note similarities and differences. It is closely related to the student's ability to distinguish between critical differences and to generalize recognizible similarities. This skill could involve the use of referents other than the things compared. It is necessary that one have an understanding of such comparatives as hotter-colder and smaller-larger, as well as a comprehension of their related values, e.g., warmer-cooler and littler-bigger.

6. TRANSLATING is the skill in which recorded observations (data) are expressed in another symbolic form. The conversion of tabular

information into a graph or of a verbal description into a drawing exemplifies this.

7. INFERRING involves drawing a conclusion based on evidence. It requires going beyond the information at hand to describe an effect or answer a question. It involves extrapolation and implication, and is closely related to two of the problem-solving skills: interpreting results and drawing conclusions.

8. APPLYING involves the utilization of a learned task or skill in some other situation than that in which the task or skill was originally learned. For example, if a child has learned to orient the top of one map with north, an application would be to orient another map in a similar manner.

9. GUESSING is the generation of ideas about outcomes in a data-poor situation. It involves using one's common sense and hunches to make the most informed judgment one can.

10. SPECULATING is the process of generating ideas about the nature or outcome of something one has not had the opportunity to observe, but about which one can think based on past experiences. It may be that a great deal is known about the subject, but without having observed it, one must describe the event from imagination.

11. PREDICTING is the skill of making informed estimates of what should happen in a given situation, based on knowledge of what enters into the situation and previous experience.

12. DIVERGENT PRODUCTION refers to the process of generating as many ideas about something as possible.

13. VALUE JUDGING involves more than simply expressing opinions or preferences. It is the comparison of things and the assignment of relative value to them, based upon some set of criteria. In this curriculum, the WHY of valuing should be sought.

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PROBLEM SOLVING SKILLS

Inquiry is finding out WHY. The process of finding the answers to WHY is problem solving. The ME AND MY ENVIRONMENT science curriculum is a structured sequence of activities that enable the student, through success, to learn to seek the answers to WHY. It is hoped that the experiences provided in the curriculum will enable the student to face and solve the problems of everyday life, both now and later.

There are at least three levels of mastery of problem solving skills. The minimum level is an awareness of the skill. The second level is the functional ability to perform it. The highest level includes the capability of designing an original experiment and carrying it to completion. It should be borne in mind that problem solving behavior is a complex package involving past experience, motivation, cognitive development, etc. The development of problem solving skills should be closely related to the appropriate inquiry skills, concepts, and other organizers of the curriculum.

A brief description of the intended interpretation of the problem solving skills follows in what we consider to be a hierarchy of easiest to most difficult.

1. EXPERIMENTING is doing something to see what happens. It is having the opportunity to "mess around" with a given piece of apparatus or set of materials, to pursue individual curiosity or interest, to explore, and to find things out.

   Some examples of experimenting include: investigating the properties of environmental objects (e.g., which ones will float, which ones can be burned, which are man-made, etc.), having the opportunity to use thermometers or balances, raising a classroom pet or plants, burning things under a pinwheel, having time to experiment with the balances, etc.

It is important to distinguish between experimenting as we have defined it and the formal aspects of experiment and experimental design. Note that the formal aspects are dealt with as a separate category and that designing experiments is thought to be the most difficult of the problem solving skills.

To encourage development of this skill, instructions such as "ALLOW STUDENTS TO MANIPULATE AND EXPERIMENT WITH THE BALANCES," "CAPITALIZE ON STUDENT INTEREST BY ALLOWING STUDENTS TO OBSERVE AND HANDLE THE PETS," etc., are given to the teacher.

2. KNOWING what the problem is and what to do to solve it. Defining the problem and its parts clearly is an important first step in any problem solving situation. We assume that recognition and definition of a problem represents a difficult task for this student population, and has therefore been placed high in the problem solving skill hierarchy. The purpose of this skill is to assist students through many experiences in recognizing that a problem exists, in defining that problem, and understanding how answers to that problem might be obtained. This skill must be emphasized (that is, the problem made explicit) for the logical development of those skills which follow. Here we are concerned that the student know the question under investigation and clearly understand the methods to be used in attempting to answer that question. The materials should emphasize, for both teachers and students, that science is a process of finding answers to questions. There is a subtle difference between telling the student the answer to the question he is investigating (e.g., "To see if it is warmer in the sun or in the shade") as opposed to making it clear what the task focus is (e.g., "To see if there are differences in the temperature of different parts of the environment, and if so, see if we can discover what makes the temperature different in different places").

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3. RECORDING DATA questions of science are answerable through observation and collection of data pertinent to the question. Recording of observations is a necessary skill to enable the investigator to recall the observations and discuss and interpret them in view of the question. Included here is the collection and transcription of information called for by the question. Making sketches, notes, taking pictures, recording sounds, recording measurements, etc., are included.

4. DISCUSSION AND TREATMENT OF GROUP DATA -- COMPARING RESULTS A look at the outcomes of each student's or student group's investigation and a discussion of why one result may differ from another should emphasize the dynamics of group discussion and dialog rather than recitation and monolog. Discussion of variability of results should assist students in the identification of variables which may influence outcomes. The ability to express or talk about what was done is involved here, with students operating primarily at the observing, identifying, describing, and comparing levels of cognition. Discussion of individual or group results provides the teacher with an opportunity to assess student understanding of the investigation and to recognize possibilities for further investigation, alternative activities to re-emphasize particular concepts, or review.

5. ORGANIZING DATA The ordering and grouping of recorded information makes it easier to interpret and see relationships. Included in this category are tabulation of data, averaging or deciding on best estimates, any visual representation such as line or bar graphs, and pictures or schematic representations. This is the most difficult skill directly related to data for students to become proficient in. Organizing data often involves the inquiry skill of translating information into a different symbolic form.

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6. EXPLAINING, DEFENDING, ANSWERING WHY QUESTIONS This involves discussion of a more sophisticated level than that previously considered. Explaining should assist in the development of the idea of cause and effect. It implies the students' understanding of the question, the procedures, and some ability to interpret results. Defending encourages confidence in one's procedures and interpretation of outcomes. Answering why questions requires an understanding of the questions and task as well as forcing students to analyze data and make interpretations. In the activity Food For Sleep, such questions as "WHERE DID THE HEAT ENERGY COME FROM?" "HOW DO YOU KNOW?" and "WHY ARE YOU TAKING THE TEMPERATURE OF ALL THREE CONTAINERS?" fall into this category. To answer such questions, the students are often operating at the inference level of cognition.

   Specific examples of such questions are included in the guide. It seems particularly appropriate for the teacher to be asking individuals or groups these kinds of questions as they proceed with an investigation. We need to emphasize, by providing questioning strategies, that discussion of this sort with individuals and small groups is an effective method of instruction which provides immediate feedback to the teacher.

7. ASKING QUESTIONS This category refers to student questions which are raised as a result of their observations, experiences, and experimenting. Teachers are given examples of the kinds of questions that students may raise and suggestions of how such questions should be dealt with.

8. IDENTIFYING VARIABLES Identification of those variables which may influence the outcome of an investigation is necessary if one is to understand the concept of a controlled experiment, if one is to make any sort of an appraisal of the
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design of an experiment or investigation, and if one is to make an intelligent interpretation of the results of an experiment. The first step toward these goals is to realize that many factors may influence an outcome and to be able to recognize and identify some of these factors. Students can learn much by asking about what affected the results. This skill is highly related to predicting.

9. IDENTIFYING CONTROLS Once the students are able to identify variables that may influence an outcome, the idea that all variables except the one under investigation must be held constant can be developed.

10. INTERPRETING RESULTS This is perhaps the most important of the problem solving skills, and may be the most difficult to develop. Explicit models for teachers and students are provided. They deal with the data collected and interpret it in terms of the question asked. Emphasis is placed on recognizing the limitations of data and that the data may or may not have answered the question; not going beyond the data; and recognizing the need for further investigation. Teachers are cautioned to avoid the temptation of ignoring the data and simply providing "the answer."

11. DRAWING CONCLUSIONS Interpretation of results may warrant drawing conclusions. The emphasis here is on drawing only those conclusions that are supported by the data collected. Some forced conclusions are inevitable because of the difficulty of providing experimental evidence; however, great care is exercised to avoid forced conclusions when an experiment is conducted and data gathered.

12. RECOGNIZING PROBLEMS AND FORMULATING QUESTIONS This skill is a necessary prerequisite for the general application of the other problem solving skills outside the classroom situation. In other

words, if we expect students to apply the problem solving skills above to their daily problems, it seems necessary that they be able to recognize that a problem exists and be able to state an appropriate question. To develop this skill, the students are presented with events or phenomenon that present an identifiable problem, and then given the opportunity to define that problem.

13. DESIGNING EXPERIMENTS Once the students are able to recognize a problem and formulate a question, an experiment to answer that question may be designed. The design should include identification of variables and controls, methods for observation, gathering data, organizing and presenting data, etc. It is assumed that this student population will be able to perform this skill only after a great deal of experience with the preceding skills.

SPECIFYING STRATEGIES FOR INSTRUCTION

The model for inquiry used in these materials demands that the focus of classroom activity be on student involvement with materials and activities. The teacher functions as a catalyst in generating pupil response in the learning situation. The response desired may be attitudinal, cognitive, or psychomotor: verbal or nonverbal. The teacher's behavior also falls in these same categories, but with an important difference: the teacher must be totally conscious of his role as a stimulus, while the student is generally unaware that he is being manipulated by strategy.

To communicate maximally with the teacher, we feel we must carefully describe as much as possible of the pattern of interaction upon which the anticipated results depend. The whole intent of this curriculum would be defeated if this pattern is not understood and implemented. We know, for example, that teachers often fail to allow children the opportunity or the time to think for themselves when a problem is posed. They also fr
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posed. They also frequently impose *their* observations and interpretations of things on children rather than allow the children to express *their own* views of things observed. We hope, therefore, to provide for teachers a *model* of strategy in these materials that will -- if initially studied and used -- demonstrate the benefits we describe for it in terms of pupil response behavior.

We do *not* anticipate that we can predict all that will occur with individual students in the classroom. We hope that we can, however, provide enough reminders to the teacher so that he will deal with unexpected or unpredicted events in the same mode in which the materials are written.

LEVELS OF OBJECTIVE STATEMENTS

UNIT GOALS

Unit goals are broad general statements that define long-term goals of a major portion of the unit. An initial statement, "The student will," is understood in each of the goals. They are defined as statements that capture the intent and emphasis of the curriculum. They also serve the function of organizers toward which the core objectives are directed.

CORE OBJECTIVES

The core objectives (stated in student behaviors) refer to the desired outcomes for sequences of activities. The role of these objectives is to summarize what the student will be able to do as a consequence of each of the activity sequences. The core objectives provide a cognitive map for the teacher to extend or elaborate on. These core objectives may also serve as evaluative guides to assess short-term progress and attainment of students.

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ACTIVITY OBJECTIVES

Activity objectives are enabling or performance objectives that relate to the specific activity. They identify the actions or behaviors students must perform or acquire to insure their success in achieving the broader objectives of the curriculum. The role of the activity objective is to provide the teacher with specific instructional landmarks both to plot the course and to chart student progress. The objectives include information which the student has repeated or restated, experiences he has had, actions he has performed, and products he has made.

ANTICIPATED STUDENT RESPONSE BEHAVIORS

These focus on specific *actions or interactions occurring during instruction*. They describe what we predict students will do or say in response to some specific strategy.

TEACHING THE MATERIALS

It is often said that man is a curious animal and that science is a content vehicle to capitalize on this phenomenon.

Science, then, for the EMH student, capitalizes on the student's natural curiosity about himself. Science is exciting, and ME AND MY ENVIRONMENT relies on this excitement. This science program has been designed to fit into the already existing curriculum framework and within individual teaching philosophies.

The amount of time spent on each activity can be tailored to fit the mood of the class and the teacher. An averate of 45 minutes may be required for all activities. Some activities will require extensive time, perhaps several days. The main point in teaching ME AND MY ENVIRONMENT is not to hurry -- to allow sufficient time for inquiry to occur.

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The ME AND MY ENVIRONMENT sequence may span three years, or it may take less time. The pace can be set by the individual teacher.

Particular attention has been given to articulating the science curriculum with the other parts of the instructional program. Sight vocabulary is included in many of the activities, and suggestions given for using these words in spelling and vocabulary lessons. Math skills are an integral part of science, and the lessons provide application of the student's math skills.

PLANNING GUIDE

Teaching the materials for the first time will require preparation time. Less preparation time is required after that. The teacher's planning guide will help you prepare materials in advance. For example, if a film is to be ordered, the planning guide will remind you when. The guide should be followed rather rigidly when initiating an activity.

OVERVIEWS

Each UNIT and CORE is provided with a summary "roadmap" to give the teacher an insight into the direction or groupings of activities.

RATIONALE

Each UNIT and CORE is provided with a section to provide background into the why of the particular material used. These rationales should be read, thought about, and continually referred back to in order for you to focus on and subsequently provide *why intentionality* to your students.

BACKGROUND INFORMATION

Some pertinent points which are not necessarily developed in the curriculum itself but which will provide you with useful information have been incorporated in this section at the beginning of each CORE.

REVIEWS TO SUCCESS AND CLUES TO SUCCESS

A portion of the evaluation program during the first field testing of ME AND MY ENVIRONMENT entailed the use of what was basically an objective pretest, administered on the days before beginning instruction on each unit, and an identical posttest administered the days following completion of each unit. The items included in each test were specifically designed to secure information on the students' background knowledge as well as to secure data about the success of the materials. They were not used to evaluate the youngsters.

Because the item designs for use with this student population proved highly effective, many of these questions, along with some situational tasks, have been incorporated into two *instructional assessment sections*. The first of these, "Clues to Success," appears periodically within various activities so that you can have immediate feedback on the effectiveness of the materials and instruction. At this point you have the unique opportunity to determine whether or not your students are ready for the next activity or whether a modification, repetition, extension, or review of certain activities is necessary before proceeding.

The "Reviews to Success" are generally concluding activities in a CORE. They enable you to assess the effectiveness of instruction for the entire CORE and to decide if the students are prepared for the next set of objectives.

WORKSHEETS

The worksheets in the program are used in a variety of ways: a) as reinforcement to general or specific objectives; b) to introduce new information and
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new information and to record data; c) to enhance the interest in an activity; d) as a culminating activity to review what has been covered in previous lessons. Difficult worksheets are duplicated on daylight slides. These worksheets should be demonstrated on the chalkboard before they are attempted by the individual students.

35mm SLIDES

This medium broadens instructional opportunities, especially during inquiry activities. The projected image should be used both by the teacher and by most students during instruction. The teaching strategies give specific instructions for using them.

You need not completely darken your classroom when using the slides. Your students should be able to write or read at their desks or move from their desks to the board while the slides are being shown. It will be desirable, however, to turn off those lights or darken those windows where the light is reflected directly from the chalkboard.

The largest possible image is usually best for the students to see clearly. Therefore, place the slide projector as far as possible from the chalkboard, but so that the image projected does not extend above or below the edges of the board.

It is expected that students and teachers will often use chalk to mark directly on the projected image.

Be sure that you are familiar with the operating instructions for the Carousel Projector and that you observe the manufacturer's cautions for insertion and projection of slides, trays, bulbs, and lenses.

GAMES

Perhaps the most ambitious of the endeavors has been to promote certain objectives through the use of games and game theory. Besides providing variation to the instructional mode, the games are used to dramatize some of the major concepts in the curriculum, as well as to give experience in cooperation and taking turns.

BOOKLETS

This medium is used as a variation to the worksheets and 35mm slides. It combines a minimum of reading with cartooned illustrations to present somewhat detailed factual information.

POLAROID CAMERA

To increase the opportunities for involving all students in the activities, a Polaroid camera has been included as part of the instructional materials. The camera is provided through the courtesy of the Polaroid Corporation.

A camera in the classroom can serve as a valuable motivation device for students, as well as a help in prolonging their ever-so-short interest span. The instant feedback from the pictures is a replay of the actual class activity, a photographic record that can be used to compare before and after conditions, a progress report of growth and development, or an assessment of the learning that took place in an activity. Actually operating the camera, manipulating parts, focusing, developing, and viewing the finished product affords an ego-building experience. Such experiences will help the student develop self-esteem and self-confidence, thus contributing to the development of a success syndrome.

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UNIT IV OVERVIEW

The focus of Unit IV is on man -- the interdependency that exists between man and his environment, and the degree to which man is capable of affecting the quality of his environment. Related activities treat sequentially the flow of energy through living things, the cyclical nature of materials, and man's place in the recycling of resources, and how he can facilitate the natural cyclic system maintained by the environment.

The first core of activities attempts to develop the concept of transferring energy and matter through environmental systems (food chains, food webs). Its intent is to create a foundation or frame of reference for the student so he can relate later concepts to the finite quantity of his environmental resources.

The second core of activities concentrates on those concepts required for the student to understand the processes of decomposition as they occur in nature and as they can be affected by man's contribution to the environmental system. How can man act to facilitate or inhibit the decomposition processes?

The third core of activities is directed toward illuminating the effects that man can have on his environment through the materials that are made by him, used by him, and eventually disposed of by him. Concepts are developed to depict the importance of managing man's waste; emphasis is placed on understanding the decomposition of non-biodegradable and biodegradable materials and how these are related to the need to recycle certain components of the environment.

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IT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

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UNIT IV RATIONALE

The earth is finite in size and material resources. Why then don't we run out of most of these resources? John Muir once said, "When we try to pick out anything by itself, we find it hitched to everything else in the universe." Unit IV attempts to answer the question and to amplify the statement of interactions and interdependencies. The transfer of food energy along food chains is reconsidered, and the interlocking of these chains into more complex food webs. From these webs, also, energy is subsequently lost from the ecosystem. Matter and materials flow through the ecosystem like energy. In contrast to energy, however, materials are continually reused through so-called biogeochemical cycles (bio = life, geo = earth, chemical = matter cycle). A significant agent in all these cycling relationships is the large group of organisms classified under the heading of decomposers. Without the decomposers, cycling through the biotic community would soon cease to exist. Thus, a primary emphasis is placed on the role (both helpful and harmful) of decomposer organisms in the environment. Ways are suggested whereby the student can act on his environment through composting and other such activities. The unit contributes to the development of a success syndrome through continued practice in inquiry and problem solving skills. It attempts to open up for the student new avenues of interest in the world around him.

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Me and my·
Environment

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIR

CORE A. ENERGY AND MATERIAL TRANSFER

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

1. Appreciate the cycling relations
   through:
   a. Understanding of what a cycl
   b. Understanding of the role of
   c. Realization that certain mat
   d. Recognition of examples of m
2. Comprehend the role of man as an

OBJE

1. Reconstruct the transfer of ener
2. Conclude that all materials are
3. Recognize that plant and animal
   beyond food chain relationships.

IT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

RE A. ENERGY AND MATERIAL TRANSFER

BSCS

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UNIT IV GOALS

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.
   c. Realization that certain materials are in finite supply.
   d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part *of* nature, not apart *from* nature.

OBJECTIVES OF CORE A

1. Reconstruct the transfer of energy through an environmental system.
2. Conclude that all materials are transferred through environmental systems.
3. Recognize that plant and animal (including man and microbes) interdependence extends beyond food chain relationships.

Me and my·
Environment

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRON

CORE A. ENERGY AND MATERIAL TRANSFER

CORE A RATIONALE

Organisms interact with each other, and with the environment, in a variety of ways. Life is entirely dependent upon these interactions. The influences of one life form upon another are often very subtle, but man and his ability to succeed as a life form are controlled by these interactions. Because of man's ability to alter the environment, and because of his tendency to make a more dramatic impact on it, what may appear to be a simple, straightforward action can have a major, long-range impact on the very interactions man is dependent upon. It is important for students to understand this idea. This core lays a foundation for a more thorough treatment of it later on in Unit V by reviewing energy flow and materials cycling in man's environment.

BACKGR

A food chain is a
other. One species is
by still another specie
life-sustaining energy
chains start (or end, d
This most fundamental c
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and started them on the
growing corn plant stor
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also storing other elem
and matter is then pass
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upon one other organism
directly from plants, a
animals supply food to
nected to many others;
viewed as linear, but m
mechanism. Thus it is
in the context of the f

IT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

RE A. ENERGY AND MATERIAL TRANSFER

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BACKGROUND INFORMATION FOR THE TEACHER

A food chain is a series of organisms that interact by eating each other. One species is eaten by another species, which in turn is utilized by still another species for food, and so forth. Each species get its life-sustaining energy from the one previous to it in the chain. All chains start (or end, depending upon your viewpoint) with the green leaf. This most fundamental cog of life converts various material and chemical components of the environment into food for all other organisms by locking the sun's energy into usable sugar and starch compounds. It is the plant that originally has drawn waterborne elements and substances from the soil and started them on their odyssey through the living world. Thus, as a growing corn plant stores and uses the sun's energy to combine carbon, oxygen, and hydrogen into the stored starch of a kernel of corn, so is it also storing other elements such as nitrogen and potassium. The energy and matter is then passed on to the chicken that eats the corn, and then on to the person who eats the chicken. But few organisms depend solely upon one other organism for food. Man acquires minerals and energy directly from plants, as well as from other animals. These plants and animals supply food to other organisms as well. One food chain is connected to many others; hence the interdependency and transfer cannot be viewed as linear, but must be seen as a highly complex and intertwined mechanism. Thus it is that the flow of materials and energy is presented in the context of the food web.

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Me and my Environment

UNIT IV
CORE A

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ☛ *in the*
be prepared several days or weeks in advance. Use thi
a teaching and preparation schedule. All supplies nee

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics a*
4-1. Food Chain Game Revisited Page _____ Date planned _____	35mm Slide projector	Worksheet 4-1 Slide 4-1 Flash cards ("Food Chain Game") "Food Chain Game" cards Camera (Polaroid Square Shooter)	Missing Links Worksheet 4-1 One deck per Four decks pe
4-2. The Trip Of A Drop Of Water Page _____ Date planned _____	35mm Slide projector	Flash cards: Hawk Cow Mosquito Snake Man Grass Frog Water symbol Energy symbol Sugar symbol Worksheet 4-2 Slide 4-2	Clue to Succes Worksheet 4-2,
4-3. The Long Journey Page _____ Date planned _____		Booklet - *The Long Journey*	One per studen

PLANNING GUIDE

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e prepared several days or weeks in advance. Use this summary as
teaching and preparation schedule. All supplies needed are listed.

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ist of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
ish	Materials in Supply Kit	
	Worksheet 4-1 Slide 4-1 Flash cards ("Food Chain Game") "Food Chain Game" cards Camera (Polaroid Square Shooter)	Missing Links Worksheet 4-1, Missing Links One deck per class Four decks per class
	Flash cards: Hawk Cow Mosquito Snake Man Grass Frog Water symbol Energy symbol Sugar symbol Worksheet 4-2 Slide 4-2	Clue to Success - Food chain Worksheet 4-2, Clue to Success - Food chain
	Booklet - *The Long Journey*	One per student

Me and my Environment

UNIT IV
CORE A

PLANNING GUIDE

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Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics a*
4-4. Food Webs Page _____ Date planned _____	Scissors Large ball of string	Flash cards ("Food Chain Game")	One deck per c One pair per c
↘ 4-5. Plant And Animal Hunt Page _____ Date planned _____	File cards 6" X 8" Crayons or colored pencils Magazines with pictures of local organisms Scissors		Two per studen ↘ *Collect many m*
4-6. Tying Up The Hunt Page _____ Date planned _____	Cards prepared in Activity 4-5 Ball of string Scissors		

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PLANNING GUIDE

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t of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
sh	Materials in Supply Kit	
	Flash cards ("Food Chain Game")	One deck per class One pair per class - include at least some left-handed ones.
cils s of		Two per student ➘ *Collect many magazines well in advance.*
vity		

Me and my Environment

UNIT IV
CORE A

PLANNING GUIDE

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be prepared several days or weeks in advance. Use t
a teaching and preparation schedule. All supplies n

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics*
4-7. Hunting In Other Areas Page _____ Date planned _____	35mm Slide projector	Slide 4-3 Slide 4-4 Slide 4-5 Slide 4-6 Slide 4-7 Slide 4-8 Slide 4-9	Fish in pon Squirrel in Alligator i Elk in moun Buffalo on Constrictor Lion on vel
4-8. Review Of Success Page _____ Date planned _____	Many magazines Scissors Butcher paper Large felt pens Paste or tape 35mm Slide projector	Worksheet 4-3 Slide 4-10 Slide 4-11 Slide 4-12	Several for One pair fo One piece f One for each Some for ea Review of S Question 1 Question 2 Question 3

PLANNING GUIDE

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ish	Materials in Supply Kit	
	Slide 4-3	Fish in pond
	Slide 4-4	Squirrel in city park
	Slide 4-5	Alligator in Everglades
	Slide 4-6	Elk in mountain meadow
	Slide 4-7	Buffalo on grassland
	Slide 4-8	Constrictor in desert
	Slide 4-9	Lion on veldt
		Several for each student
		One pair for each student
		One piece for each student
		One for each student
		Some for each student
	Worksheet 4-3	Review of Success
	Slide 4-10	Question 1 Review Of Success
	Slide 4-11	Question 2 Review Of Success
	Slide 4-12	Question 3 Review Of Success

Me and my · Environment

UNIT IV
CORE A

PLANNING GUIDE

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	Materials You Furnish	Materials in Supply Kit	
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☛ 4-5. Plant And Animal Hunt Page _____ Date planned _____	File cards 6" X 8" Crayons or colored pencils Magazines with pictures of local organisms Scissors		Two per student ☛ *Collect many ma*
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PLANNING GUIDE

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	Flash cards ("Food Chain Game")	One deck per class One pair per class - include at least some left-handed ones.
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Me and my Environment

UNIT IV
CORE A

PLANNING GUIDE

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	Materials You Furnish	Materials in Supply Kit	(*Italics*
4-7. Hunting In Other Areas Page _____ Date planned _____	35mm Slide projector	Slide 4-3 Slide 4-4 Slide 4-5 Slide 4-6 Slide 4-7 Slide 4-8 Slide 4-9	Fish in pond Squirrel in Alligator in Elk in mount Buffalo on g Constrictor Lion on veld
4-8. Review Of Success Page _____ Date planned _____	Many magazines Scissors Butcher paper Large felt pens Paste or tape 35mm Slide projector	Worksheet 4-3 Slide 4-10 Slide 4-11 Slide 4-12	Several for One pair for One piece fo One for each Some for eac Review of Su Question 1 R Question 2 R Question 3 R

PLANNING GUIDE

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List of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
nish	Materials in Supply Kit	
	Slide 4-3	Fish in pond
	Slide 4-4	Squirrel in city park
	Slide 4-5	Alligator in Everglades
	Slide 4-6	Elk in mountain meadow
	Slide 4-7	Buffalo on grassland
	Slide 4-8	Constrictor in desert
	Slide 4-9	Lion on veldt
		Several for each student
		One pair for each student
		One piece for each student
		One for each student
		Some for each student
	Worksheet 4-3	Review of Success
	Slide 4-10	Question 1 Review Of Success
	Slide 4-11	Question 2 Review Of Success
	Slide 4-12	Question 3 Review Of Success

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

1. Reconstruct the transfer of energy through an environmental system.

MATERIALS

TEACHING STRATEGIES

Activity 4-1. The Food Chain Game Revisited

Through this activity the students will be given an opportunity to review the concepts associated with building food chains, covered earlier in Unit III. Students will build food chains and trace energy flow along the chain. At the same time the teacher will be able to assess whether the students understand the concept that all the food for animals (man included) comes from plants.

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OCUS FOR THIS ACTIVITY

OALS:

. Appreciate the cycling relationships of the materials and organisms in the environment through:

  a. Understanding of what a cycle is.

  d. Recognition of examples of man's impact upon the environment.

. Comprehend the role of man as an integral part *of* nature, not apart *from* nature.

OBJECTIVES:

. Reconstruct the transfer of energy through an environmental system.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE A. ENERGY AND MATERIAL TRANSFER

ACTIVITY 4-1. THE FOOD CHAIN GAME REVISITED

BSCS

TEACHING STRATEGIES

1. The Food Chain Game Revisited

s activity the students will be given an
to review the concepts associated with build-
ains, covered earlier in Unit III. Students
food chains and trace energy flow along the
the same time the teacher will be able to assess
students understand the concept that all the
imals (man included) comes from plants.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have played the food chain game.
--have felt successful and enjoyed the game.
--be able to defend a food chain sequence.
--be able to complete the worksheet, "Missing links."

ACTIVITY 4-1

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MATERIALS

1 Deck of flash cards (from Activity 3-2 of Unit III)
4 Decks of Food Chain Cards
Worksheet 4-1
Slide 4-1
*35mm Slide projector
Camera (Polaroid Square Shooter)

*Not furnished in materials kit

TEACHING STRATEGIES

Teacher Preparation:

1. Have available ample table space for four groups to play the card game.
2. This activity, because of its length, is divided into Part I and Part II. The first part introduces the concept of food chains and the fact that they end in a plant. The second part of the activity consists of a game which gives the students an opportunity to build food chains.

Some students will remember this game from their exposure to it in Unit III. Capitalize on their awareness by placing one of them in each group of students taking part in this activity so that they may act as catalysts in initiating discussion.

Part I.

Hold up the deck of flash cards and say:

HOW MANY OF YOU REMEMBER PLAYING THIS SCIENCE GAME?

WHAT IS IT THAT WE LEARNED FROM THE GAME?

> If sufficient recall does not occur, or if you feel that further review is necessary, say:
>
> ONE THING WE TRIED TO DO IN THIS GAME WAS TO DECIDE WHAT IT IS THAT ANIMALS EAT.

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TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
aration: vailable ample table space for four groups to he card game. ctivity, because of its length, is divided art I and Part II. The first part introduces ncept of food chains and the fact that they a plant. The second part of the activity ts of a game which gives the students an nity to build food chains. s will remember this game from their exposure t III. Capitalize on their awareness by of them in each group of students taking part vity so that they may act as catalysts in scussion.	
deck of flash cards and say: OF YOU REMEMBER PLAYING THIS GAME?	--indicate whether or not they recall the game.
IT THAT WE LEARNED FROM THE GAME?	--who recall the game could respond with: "We learned what a food chain is." "A food chain is a series of animals that eat other animals and/or plants." "All food in a food chain starts with plants." "We learned who has whom for dinner."
sufficient recall does not occur, or if you l that further review is necessary, say: THING WE TRIED TO DO IN THIS GAME WAS TO IDE WHAT IT IS THAT ANIMALS EAT.	

MATERIALS

TEACHING STRATEGIES

Display the card depicting a hawk. Ask the students to identify the bird, and then fasten the picture to the chalkboard by means of tape, or set the card on the left side of the chalk tray.

Spread out the rest of the cards in the deck and ask a student to select a card depicting something a hawk eats.

Again display the "hawk food" card, asking the students to identify it.

Say:

HAWKS DO EAT _______ AND OTHER THINGS.

Fasten or set up the picture to the right of the hawk.

(Student's name) DRAW AN ARROW FROM THE HAWK TO THE _____ TO SHOW THAT A HAWK EATS A _____.

Continue to build a food chain by saying:

NOW WHAT DO YOU THINK (prey) EAT?

Continue until you have completed a logical food chain down to the plant source. Some possible examples follow:

HAWK → SNAKE → MOUSE → GRASSHOPPER → GRASS

HAWK → MOUSE → GRAIN

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
Display the card depicting a hawk. Ask the students to identify the bird, and then fasten the picture to the chalkboard by means of tape, or set the card on the left side of the chalk tray.	--should identify the bird as a hawk.
Spread out the rest of the cards in the deck and ask a student to select a card depicting something a hawk eats.	--will select a card depicting a frog, snake, chicken, mouse, rabbit, or song bird.
Again display the "hawk food" card, asking the students to identify it.	
Say:	
HAWKS DO EAT _______ AND OTHER THINGS.	
Fasten or set up the picture to the right of the hawk.	
(Student's name) DRAW AN ARROW FROM THE HAWK TO THE _____ TO SHOW THAT A HAWK EATS A _____.	--will draw an arrow pointing to the prey between the hawk and prey.
Continue to build a food chain by saying:	
NOW WHAT DO YOU THINK (prey) EAT?	--should select appropriate food of the prey, place it to the right of the first two cards, and draw an arrow between the two.
Continue until you have completed a logical food chain down to the plant source. Some possible examples follow:	
HAWK → SNAKE → MOUSE → GRASSHOPPER → GRASS	
HAWK → MOUSE → GRAIN	

MATERIALS

TEACHING STRATEGIES

HAWK → FROG → MOSQUITO → MAN → COW → GRASS

HAWK → SONG BIRD → WORM → LEAF

Then point to the board and say:

NOTICE THAT WE HAVE SEVERAL ANIMALS THAT DEPEND ON ONE ANOTHER FOR THEIR FOOD. SINCE EACH IS LINKED TO THE NEXT BECAUSE OF EATING HABITS WE CALL THIS A FOOD CHAIN.

Write "food chain" on the board.

WHAT DO ANIMALS USE FOOD FOR? (WHAT DO ANIMALS GET FROM FOOD?)

INSTEAD OF THINKING OF FOOD LET'S THINK OF ENERGY. STARTING WITH THE PLANT LET'S TRACE ENERGY ALONG THE FOOD CHAIN.

As the student does the tracing make a statement similar to:

ENERGY FROM THE GRASS IS TRANSFERRED TO THE COW AS THE COW EATS AND DIGESTS THE GRASS. THE COW USES SOME OF IT TO LIVE AND GROW. IT STORES SOME OF IT IN ITS FAT AND MUSCLES. ENERGY IS TRANSFERRED FROM THE COW TO THE MAN AS HE EATS THE HAMBURGER. THEN ENERGY IS TRANSFERRED FROM THE MAN TO THE MOSQUITO AS THE MOSQUITO SUCKS BLOOD FROM THE MAN...ETC.

THUS, WHERE DID THE HAWK'S ENERGY ORIGINALLY COME FROM?

If students have difficulty in answering this question, trace the chain in reverse order by saying:

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TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
AWK → FROG → MOSQUITO → MAN → COW → GRASS	
AWK → SONG BIRD → WORM → LEAF	
hen point to the board and say:	
OTICE THAT WE HAVE SEVERAL ANIMALS THAT DEPEND N ONE ANOTHER FOR THEIR FOOD. SINCE EACH IS INKED TO THE NEXT BECAUSE OF EATING HABITS WE ALL THIS A FOOD CHAIN.	
chain" on the board.	
O ANIMALS USE FOOD FOR? (WHAT DO ANIMALS OM FOOD?)	--recall that food contains stored energy which is released during respiration and reply, "Energy."
D OF THINKING OF FOOD LET'S THINK OF . STARTING WITH THE PLANT LET'S TRACE ALONG THE FOOD CHAIN.	--point to the plant and then to each succeeding animal in the chain.
ent does the tracing make a statement similar	
FROM THE GRASS IS TRANSFERRED TO THE THE COW EATS AND DIGESTS THE GRASS. THE ES SOME OF IT TO LIVE AND GROW. IT STORES F IT IN ITS FAT AND MUSCLES. ENERGY IS ERRED FROM THE COW TO THE MAN AS HE EATS MBURGER. THEN ENERGY IS TRANSFERRED FROM N TO THE MOSQUITO AS THE MOSQUITO SUCKS FROM THE MAN...ETC.	
HERE DID THE HAWK'S ENERGY ORIGINALLY ROM?	--reply, "The grass that the cow ate."
students have difficulty in answering this estion, trace the chain in reverse order by ying:	

MATERIALS

TEACHING STRATEGIES

> THE HAWK GOT ITS ENERGY FROM THE FROG, WHO GOT ITS ENERGY FROM THE MOSQUITO, WHO GOT ITS ENERGY FROM THE MAN...ETC.

Continue building other chains and by tracing the energy flow through them until you feel that the students have fully grasped the idea of the chaining of foods.

As a point of departure ask several students to begin with man and build chains of things he eats.

As an added feature have students, working in groups of three or four, take appropriate pictures with which to build a photographic food chain. To some groups you may give the hint to start the chain with man. Permit the more capable students to start with any animal and proceed to the plant source. If the supply of film permits, encourage pupils to try for a chain as long as possible.

Only one group of students will be able to work at a time, because of limited equipment. In order to expedite the task, permit students to work between classes, at lunch break, etc.

Have the students display (from left to right) their chains; draw arrows and label each link; then follow with discussion, questions-answers period.

Then say:

TEACHING STRATEGIES

THE HAWK GOT ITS ENERGY FROM THE FROG, WHO
GOT ITS ENERGY FROM THE MOSQUITO, WHO GOT
ITS ENERGY FROM THE MAN...ETC.

building other chains and by tracing the energy
ough them until you feel that the students have
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uild chains of things he eats.

CAMERA TIME

ed feature have students, working in groups of
four, take appropriate pictures with which to
hotographic food chain. To some groups you may
hint to start the chain with man. Permit the
ble students to start with any animal and
o the plant source. If the supply of film
encourage pupils to try for a chain as long as

group of students will be able to work at a time,
f limited equipment. In order to expedite the
mit students to work between classes, at lunch
c.

students display (from left to right) their
raw arrows and label each link; then follow
ussion, questions-answers period.

ANTICIPATED STUDENT BEHAVIORS

Students:

--will build such examples as:

MAN → CHICKEN → GRASSHOPPER → GRASS

MAN → COW → CORN

MATERIALS

TEACHING STRATEGIES

THERE ARE MANY EXAMPLES OF CHAINS WE COULD DISCUSS. YOU CAN SEE THAT WHILE ALL ANIMALS DEPEND ON OTHER LIVING THINGS FOR FOOD, NOT ALL OF THE CHAINS ARE THE SAME LENGTH. THESE CHAINS ALL HAVE ONE THING IN COMMON, HOWEVER. CAN ANYBODY SEE WHAT THAT IS?

> If students fail to perceive that each chain ends with a plant, ask:
>
> LOOK AT THE END OF EACH CHAIN ON THIS SIDE OF THE BOARD (point to the right side). WHAT IS THE SAME ABOUT EACH OF THESE LIVING THINGS?
>
> Say:
>
> IF WE WERE TO BUILD OTHER CHAINS LIKE THESE, WE WOULD EXPECT TO END WITH WHAT KIND OF LIVING THINGS?

Have students recall Activity 3-11 where they traced ingredients of a hamburger to their sources.

Say:

DO YOU REMEMBER WHAT WE ENDED WITH WHEN WE TRACED THE HAMBURGER AND ITS BUN TO ITS SOURCE?

NOW LOOK AT OUR FOOD CHAINS. WHAT DO WE END UP WITH IN EVERY FOOD CHAIN?

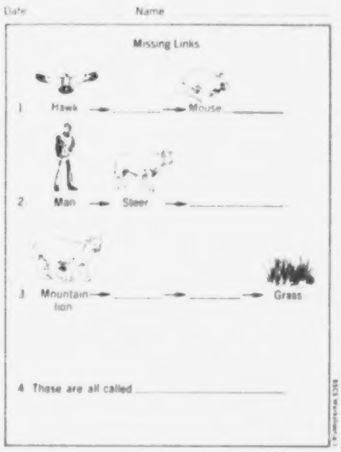
WHAT DO WE END UP WITH IN FOOD SOURCES AND FOOD CHAINS?

Make sure this concept is clear before proceeding.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ARE MANY EXAMPLES OF CHAINS WE COULD S. YOU CAN SEE THAT WHILE ALL ANIMALS ON OTHER LIVING THINGS FOR FOOD, NOT THE CHAINS ARE THE SAME LENGTH. THESE ALL HAVE ONE THING IN COMMON, HOWEVER. YBODY SEE WHAT THAT IS?	--respond, "All begin with an animal," "Linked together," "I don't know," "All end in a plant."
f students fail to perceive that each chain nds with a plant, ask:	
OOK AT THE END OF EACH CHAIN ON THIS SIDE F THE BOARD (point to the right side). WHAT S THE SAME ABOUT EACH OF THESE LIVING THINGS?	--respond, "All are plants."
ay:	
F WE WERE TO BUILD OTHER CHAINS LIKE THESE, E WOULD EXPECT TO END WITH WHAT KIND OF LIVING HINGS?	--recall, "Plants."
ts recall Activity 3-11 where they traced of a hamburger to their sources.	
REMEMBER WHAT WE ENDED WITH WHEN WE THE HAMBURGER AND ITS BUN TO ITS ?	--recall hamburger transparency and say, "Plants."
OK AT OUR FOOD CHAINS. WHAT DO WE END H IN EVERY FOOD CHAIN?	--conclude, "Plants."
O WE END UP WITH IN FOOD SOURCES AND HAINS?	--respond, "Plants."
his concept is clear before proceeding.	

MATERIALS

Worksheet 4-1



Date Name

Missing Links

1 Hawk → ______ → Mouse ______

2 Man → Steer → ______

3 Mountain lion → ______ → ______ → Grass

4 These are all called ______

Slide 4-1

TEACHING STRATEGIES

CLUES TO SU

At this point use Worksheet 4-1 to assess if the concept is clear. Place randomly on the chalk tray the following cards which represent correct responses to the blanks in the worksheet: snake grass grain chicken insect worms.

Distribute Worksheet 4-1 and say:

> HERE ARE THE MISSING LINKS ASKED FOR ON YOUR WORKSHEETS. I'VE MIXED THEM UP, SO YOU MUST CHOOSE THE RIGHT ONE FOR YOUR ANSWER. WRITE THE NAME OF THE LINK IN THE PROPER SPACE.

Ask students to put their names on the worksheets and collect them to look at later. Now write the first chain on the chalkboard and ask different students to tell (and defend) what could go in the blanks. Do this for the second and third chains. Remember there are several answers possible for each. Encourage discussion. Praise all good ideas.

Later, use Tallysheet 4-1 to note any student who had difficulties (or the whole class if necessary). Give these particular students encouragement and support when they play the "Food Chain Game."

ACTIVITY 4-1

(11)

TEACHING STRATEGIES

CLUES TO SUCCESS

t use Worksheet 4-1 to assess if the concept
lace randomly on the chalk tray the following
represent correct responses to the blanks
heet: snake grass grain chicken insect

orksheet 4-1 and say:

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od ideas.

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(or the whole class if necessary). Give
lar students encouragement and support when
"Food Chain Game."

ANTICIPATED STUDENT BEHAVIORS

Students:

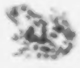
--should study the choices in the chalk tray and write in an appropriate link in the blanks on the worksheet. Correct answers for each chain are:

1. Hawk → snake → mouse → grass or grain.
2. Man → cow → grass or grain.
3. Lion → chicken → insects or worms → grass.

MATERIALS

Part II.

1 Deck flash cards
4 Decks of Food Chain Cards


Frog

Snake

Worm

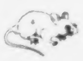
Insects

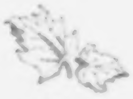
Steer

Pig

Rabbit

Deer


Mouse


Leaves

Grasses

Fruits & Berries

Grain

TEACHING STRATEGIES

Part II.

WE'VE ONLY BUILT A FEW FOOD CHAINS. WE SHOULD BUILD SOME MORE. WE'LL DO THIS BY PLAYING THE "FOOD CHAIN GAME."

Prepare the students to play by dividing the class into groups of three or four. Distribute a deck of food chain cards to each group. Allow time for them to examine the cards. Point out that this deck differs from the flash cards in that it also includes cards with plants pictured.

Say:

THE OBJECT OF THIS GAME IS TO BUILD FOOD CHAINS. YOU WILL DO THIS BY USING THE LIVING THINGS PICTURED ON THE CARDS. THIS GAME IS SIMILAR TO THE RUMMY GAME YOU PLAYED BEFORE. I'LL EXPLAIN THE RULES AND THEN PLAY THE GAME WITH TWO OF YOU SO WE CAN SEE HOW IT IS PLAYED.

1. AFTER THE CARDS ARE SHUFFLED EACH PLAYER WILL BE DEALT FOUR CARDS TO START WITH.

2. THE REST OF THE CARDS ARE PLACED FACE DOWN IN THE MIDDLE OF THE TABLE AND THE TOP CARD ON THAT PILE IS TURNED FACE UP BESIDE THE OTHERS.

3. EACH PLAYER LOOKS AT THE CARDS IN HIS HAND TO SEE IF ANY OF HIS CARDS FORM A FOOD CHAIN. ONE RULE TO REMEMBER IS THAT CHAINS MUST BE COMPLETE -- THEY MUST BEGIN WITH AN ANIMAL AND END WITH A PLANT.

TEACHING STRATEGIES

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BUILD SOME MORE. WE'LL DO THIS
YING THE "FOOD CHAIN GAME."

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t it also includes cards with plants pictured.

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ERS.

H PLAYER LOOKS AT THE CARDS IN HIS HAND
SEE IF ANY OF HIS CARDS FORM A FOOD CHAIN.
RULE TO REMEMBER IS THAT CHAINS MUST BE
PLETE -- THEY MUST BEGIN WITH AN ANIMAL
END WITH A PLANT.

ANTICIPATED STUDENT BEHAVIORS

Students:

--should reexamine the deck so as to become further acquainted with individual cards.

MATERIALS

TEACHING STRATEGIES

4. DETERMINE WHICH PLAYER GOES FIRST BY "PICKING A NUMBER FROM ONE TO TEN." BEFORE HE LAYS ANY CARDS DOWN, HE DRAWS EITHER THE TOP CARD FROM THE FACE DOWN PILE OR THE TOP CARD FROM THE FACE UP PILE.

5. IF HE HAS ONE OR MORE FOOD CHAINS IN HIS HAND, HE MAY NOW LAY DOWN THE CARDS FACE UP ON THE TABLE IN THE CORRECT ORDER, DECLARING WHO EATS WHOM AS HE DOES SO. LAY THE CARDS DOWN SO THAT THEY FORM A CHAIN FROM LEFT TO RIGHT.

6. HE THEN PICKS FROM THE FACE DOWN PILE THE NUMBER OF CARDS HE JUST PUT DOWN. AFTER RESTORING HIS HAND TO THE FIVE CARDS HE BEGAN WITH, HE DISCARDS ONE AND IS BACK TO HIS ORIGINAL HAND OF FOUR. EACH PLAYER WILL HAVE FOUR CARDS AT THE BEGINNING OF HIS TURN, DRAW ONE SO THAT DURING THIS TURN HE HAS FIVE CARDS, AND DISCARD AT THE END OF HIS TURN (BACK TO FOUR CARDS).

7. EACH PLAYER TAKES HIS TURN. CARDS DRAWN ARE USED TO FORM NEW CHAINS OR TO ADD TO OTHERS. (For example: A student may lay down a mouse, insect, and grain as a chain. During a later turn, a snake could be added to the beginning of the chain.)

8. EACH CARD IS WORTH ONE POINT. THE FIRST PERSON TO LAY DOWN ENOUGH CHAINS SO THAT THEY HAVE AT LEAST TEN POINTS IS THE WINNER. ALL FOOD CHAINS MUST BE COMPLETE AND END WITH A PLANT.

NOTE: If any questions arise about what eats what, make it clear that for purposes of the game the eating habits as described on the cards will be the only ones accepted.

TEACHING STRATEGIES

ERMINE WHICH PLAYER GOES FIRST BY "PICKING
UMBER FROM ONE TO TEN." BEFORE HE LAYS
CARDS DOWN, HE DRAWS EITHER THE TOP CARD
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FACE UP PILE.

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as described on the cards will be the only
ccepted.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY 4-1
⑭

MATERIALS	TEACHING STRATEGIES
	Now select two or three students and go over the rules again demonstrating how the game is played. Continue the demonstration only until the game is understood. Then allow the students to play the g[illegible] as long as it seems appropriate. Conclude by saying: FROM PLAYING THIS GAME WHAT HAVE WE LEARNED? WHY ARE ANIMALS IMPORTANT TO EACH OTHER?

DEMONSTRATE

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
two or three students and go over the rules strating how the game is played. Continue ration only until the game is understood. Then tudents to play the game as long as it seems .	--should observe two or three classmates and the teacher playing the game. --should demonstrate ability to play the game following the rules described.
saying:	
LAYING THIS GAME WHAT HAVE WE LEARNED?	--respond, "Animals are important to each other and depend on each other," "All animals depend on plants."
ANIMALS IMPORTANT TO EACH OTHER?	--conclude, "Because they eat each other," "They get energy from each other," "They wouldn't have any food without each other," "They'd die." Statements should indicate interdependency of living things in terms of food.

UNIT IV, CORE A
Activity 4-1: "The Food Chain Game Revisited"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

BSCS Evaluation: **EMH Feedback Form 1c**

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did students have difficulty stating that all energy originally comes from plants?
☐ No ☐ Yes: Comment.

18. Were any students unsuccessful in playing the food chain game?
☐ No ☐ Yes: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE A

Activity 4-1: "The Food Chain Game Revisited"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

1. Reconstruct the transfer of energy through an environmental system.
2. Conclude that all materials are transferred through environmental systems.

MATERIALS

Flash cards:

Hawk
Cow
Mosquito
Snake
Man
Grass
Frog

TEACHING STRATEGIES

Activity 4-2. The Trip Of A Drop Of Water

In the same way that energy transfer is implicit in the "Food Chain Game", so is the transfer of material. This activity will make that transfer explicit.

Teacher Preparation:

Set up in random order on the chalkboard tray the flash cards indicated. Ask for a student volunteer to arrange the cards into one food chain that utilizes every card.

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

  a. Understanding of what a cycle is.

  b. Understanding of the role of decomposers.

Comprehend the role of man as an integral part of nature, not apart from nature.

BJECTIVES:

Reconstruct the transfer of energy through an environmental system.

Conclude that all materials are transferred through environmental systems.

TEACHING STRATEGIES

. The Trip Of A Drop Of Water

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aration:

ndom order on the chalkboard tray the flash ted. Ask for a student volunteer to arrange to one food chain that utilizes every card.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE A. ENERGY AND MATERIAL TRANSFER

ACTIVITY 4-2. THE TRIP OF A DROP OF WATER

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--be able to move energy and matter symbols from one component to another in a food chain.

--have demonstrated an understanding of energy and matter transfer by correctly completing Worksheet 4-2.

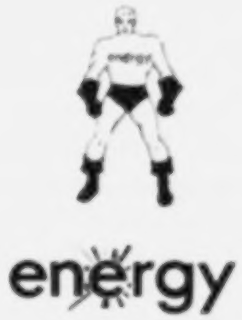
--arrange the seven cards into the following food chain: Hawk → Snake → Frog → Mosquito → Man Cow → Grass.

ACTIVITY 4-2
⑯

MATERIALS

Energy symbol
Sugar symbol
Water symbol
Slide 4-2
Worksheet 4-2
*35mm Slide projector

Energy Symbol



*Not furnished in materials kit

TEACHING STRATEGIES

Point to the food chain and say:

> WE TALKED OF HOW ENERGY MOVES FROM ONE THING TO ANOTHER IN A FOOD CHAIN.

Hold up the energy symbol and say:

> I'M PLACING THIS SYMBOL FOR ENERGY IN THE GRASS. (Student's name), MOVE THE ENERGY SYMBOL TO WHERE THAT ENERGY IS TRANSFERRED NEXT IN THIS FOOD CHAIN.

After the student has correctly placed the symbol on the cow ask:

> (Student's name), HOW DOES THE COW GET THE ENERGY?

Continue in the same manner, giving other students the opportunity to move the energy symbol and to answer what the direct energy source is. At this time redirect the discussion to focus on the cycling of materials through the food chains.

> WE'VE JUST SEEN THAT ENERGY IS PASSED ALONG FROM ONE THING TO ANOTHER IN THE ENVIRONMENT. ARE THERE ANY OTHER THINGS BESIDES ENERGY THAT ARE PASSED ALONG IN A FOOD CHAIN?

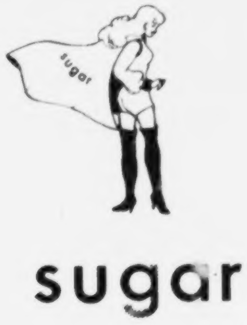
> > If food is given as an answer, ask:
> >
> > WHAT IS THE FOOD THAT PLANTS MAKE?

Place the sugar symbol on the grass.

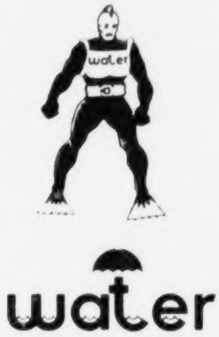
TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
he food chain and say:	
LKED OF HOW ENERGY MOVES FROM ONE THING NOTHER IN A FOOD CHAIN.	
e energy symbol and say:	
PLACING THIS SYMBOL FOR ENERGY IN THE GRASS. dent's name), MOVE THE ENERGY SYMBOL TO WHERE ENERGY IS TRANSFERRED NEXT IN THIS FOOD N.	--move the energy symbol to the cow.
student has correctly placed the symbol on the	
ent's name), HOW DOES THE COW GET THE Y?	--reply, "It eats the grass."
n the same manner, giving other students the y to move the energy symbol and to answer irect energy source is. At this time redirect sion to focus on the cycling of materials e food chains.	
JUST SEEN THAT ENERGY IS PASSED ALONG FROM HING TO ANOTHER IN THE ENVIRONMENT. ARE ANY OTHER THINGS BESIDES ENERGY THAT ARE D ALONG IN A FOOD CHAIN?	--will, drawing upon past experience, most likely answer, "Food," and possibly, "Water."
If food is given as an answer, ask:	
WHAT IS THE FOOD THAT PLANTS MAKE?	--recall what the food manufactured as an end product of photosynthesis is, and answer, "Sugar."
sugar symbol on the grass.	

MATERIALS

Sugar Symbol



Water Symbol



TEACHING STRATEGIES

(Student's name), MOVE THE SUGAR SYMBOL TO WHERE IT IS TRANSFERRED AFTER IT LEAVES THE PLANT.

SUGAR IS PASSED ALONG. HOW COULD A COW GET THE SUGAR A PLANT MAKES?

NOW (student's name), MOVE THE SUGAR SYMBOL TO WHERE THE SUGAR COULD BE TRANSFERRED NEXT IN THE FOOD CHAIN.

HOW CAN THE MAN GET THE SUGAR THAT WAS ONCE A PART OF THE PLANT?

Continue the strategy in a similar manner and again give a variety of students the opportunity to participate. Then set up another chain and say:

SUGAR IS NOT THE ONLY MATERIAL THAT WE MENTIONED THAT IS PASSED FROM ONE LINK TO ANOTHER ALONG A CHAIN.

Say:

TAKE THIS WATER SYMBOL AND SHOW AND TELL US HOW IT WOULD GET FROM ONE END OF THE CHAIN TO THE OTHER.

Conclude by saying:

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
nt's name), MOVE THE SUGAR SYMBOL TO T IS TRANSFERRED AFTER IT LEAVES NT.	--move the sugar symbol to the cow.
S PASSED ALONG. HOW COULD A COW GET AR A PLANT MAKES?	--reply, "Eat the plant."
udent's name), MOVE THE SUGAR SYMBOL TO HE SUGAR COULD BE TRANSFERRED NEXT FOOD CHAIN.	--inspect the chain and move the sugar symbol to the man.
THE MAN GET THE SUGAR THAT WAS PART OF THE PLANT?	--reply, "Eat the cow (hamburger, steak)."
strategy in a similar manner and again give students the opportunity to participate. Then er chain and say:	
S NOT THE ONLY MATERIAL THAT WE MENTIONED PASSED FROM ONE LINK TO ANOTHER ALONG A	
IS WATER SYMBOL AND SHOW AND TELL US HOW D GET FROM ONE END OF THE CHAIN TO THE	--place the water symbol on the plant (at the plant end of the chain) and move it from link to link. While doing so they should indicate their understanding by making statements similar to: "The water from the corn is transferred to the mouse when it eats the corn, and then on to the snake when the snake eats the mouse, and finally to the hawk when the hawk eats the snake."
saying:	

ACTIVITY 4-2
⑱

MATERIALS

Worksheet 4-2

Slide 4-2

TEACHING STRATEGIES

THERE ARE MANY OTHER MATERIALS TRANSFERRED FROM ONE PART OF THE FOOD CHAIN TO THE OTHER. THIS IS TRUE OF MANY CHEMICALS AND MINERALS. YOU HAVE PROBABLY HEARD OF SOME OF THEM: CARBON, OXYGEN, IRON, NITROGEN, IODINE, AND CALCIUM.

CLUES TO

Distribute Worksheet 4-2 and project Slide 4-2. Continue by drawing attention to the components and saying:

LOOK AT THE PICTURE ON YOUR WORKSHEET.

WHAT IS SHOWN IN A?

WHAT IS SHOWN IN B?

WHAT IS SHOWN IN C?

WHAT IS SHOWN IN D?

WHAT IS SHOWN IN E?

WHAT IS SHOWN IN F?

As students describe each picture write on the chalkboard:

A. Caterpillar
B. Chicken

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ARE MANY OTHER MATERIALS TRANSFERRED NE PART OF THE FOOD CHAIN TO THE OTHER. IS TRUE OF MANY CHEMICALS AND MINERALS. VE PROBABLY HEARD OF SOME OF THEM: , OXYGEN, IRON, NITROGEN, IODINE, AND M.	
Worksheet 4-2 and project Slide 4-2. Continue attention to the components and saying:	
T THE PICTURE ON YOUR WORKSHEET.	
S SHOWN IN A?	--respond, "A caterpillar eating grass."
S SHOWN IN B?	--respond, "A chicken eating the caterpillar."
S SHOWN IN C?	--respond, "A girl eating a chicken leg."
S SHOWN IN D?	--respond, "A fly biting the girl."
S SHOWN IN E?	--respond, "A fish eating the fly."
S SHOWN IN F?	--respond, "A cat (bobcat) eating the fish."
describe each picture write on the chalkboard: terpillar icken	

CLUES TO SUCCESS

MATERIALS

TEACHING STRATEGIES

C. Girl
D. Fly
E. Fish
F. Cat

Say:

> NOW I'LL READ THE SENTENCES AND YOU WRITE IN THE WORD IN THIS LIST THAT FITS. DON'T TELL ANYONE ELSE WHAT YOU WROTE UNTIL EVERYONE HAS DECIDED FOR HIMSELF AND WRITTEN IN ALL THE WORDS. THEN WE WILL TALK ABOUT YOUR ANSWERS.

Read each sentence pausing long enough for each student to write in his answer.

When all have answered, again read each statement and have students tell and explain their answers.

HAVE YO
INVOLVE
ALL
STUDENT

Then have them write their names on the worksheets and hand them in for you to tally and review later. (Don't forget to return their papers!)

NOTE: If a student's paper illustrates a problem on a worksheet, annotate it and send it in.

TEACHING STRATEGIES

l ,

h

L READ THE SENTENCES AND YOU WRITE IN
D IN THIS LIST THAT FITS. DON'T TELL
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ksheet, annotate it and send it in.

ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE A
TALLYSHEET 4-1
ACTIVITY 4-1: WORKSHEET 4-1 AND ACTIVITY 4-2: WORKSHEET 4-2

		Worksheet 1, Activity 1 Circle yes if answer is acceptable			Worksheet 2, Activity 2 Circle yes if answer is acceptable		
Teacher		1 (Hawk chain)	2 (Man chain)	3 (Lion chain)	1 (Cater pillar)	2 Both fly and fish	3 All arrows
Attach class list here	01	yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no
		yes no	yes no	yes no	yes no	yes no	yes no

	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no
	yes no	yes no	yes no	yes no	yes no	yes no

UNIT IV, CORE A
Activity 4-2: "The Trip Of A Drop Of Water"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ______ ______ ______ ______
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ______ ______ ______ ______
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No - Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No - Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

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Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No - Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No - Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did students remember (and not seem surprised) that plants make sugar?
☐ No ☐ Yes: Comment.

18. Did students have difficulty answering Worksheet 4-1? (6 pictures on energy/material flow) ☐ No ☐ Yes: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

BSCS Evaluation: EMH Feedback Form 1c

UNIT IV, CORE A
Activity 4-2: "The Trip Of A Drop Of Water"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    c. Realization that certain materials are in finite supply.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

2. Conclude that all materials are transferred through environmental systems.

MATERIALS

Booklet (*The Long Journey*)

TEACHING STRATEGIES

Activity 4-3. The Long Journey: A Review

As a built-in redundancy and review, this activity in story form traces the flow of an atom of nitrogen backwards from its incorporation in an individual.

Initiate the activity by passing out the booklet, *The Long Journey*, and saying:

> WE'VE TALKED OF MATERIALS TRANSFER FROM ONE PART OF THE FOOD CHAIN TO ANOTHER. FOLLOW WITH ME AS I READ THIS STORY TO YOU.

FOCUS FOR THIS ACTIVITY

GOALS:

. Appreciate the cycling relationships of the materials and organisms in the environment through:

  a. Understanding of what a cycle is.

  b. Understanding of the role of decomposers.

  c. Realization that certain materials are in finite supply.

  d. Recognition of examples of man's impact upon the environment.

. Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

. Conclude that all materials are transferred through environmental systems.

TEACHING STRATEGIES

3. The Long Journey: A Review

in redundancy and review, this activity in
traces the flow of an atom of nitrogen back-
its incorporation in an individual.

e activity by passing out the booklet, *The Long*
d saying:

TALKED OF MATERIALS TRANSFER FROM ONE
F THE FOOD CHAIN TO ANOTHER. FOLLOW WITH
I READ THIS STORY TO YOU.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE A. ENERGY AND MATERIAL TRANSFER

ACTIVITY 4-3. THE LONG JOURNEY: A REVIEW

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--*have read the booklet,* The Long Journey.
--*have demonstrated his understanding of matter movement in the environment by tracing a particle of nitrogen from the air to the hair.*

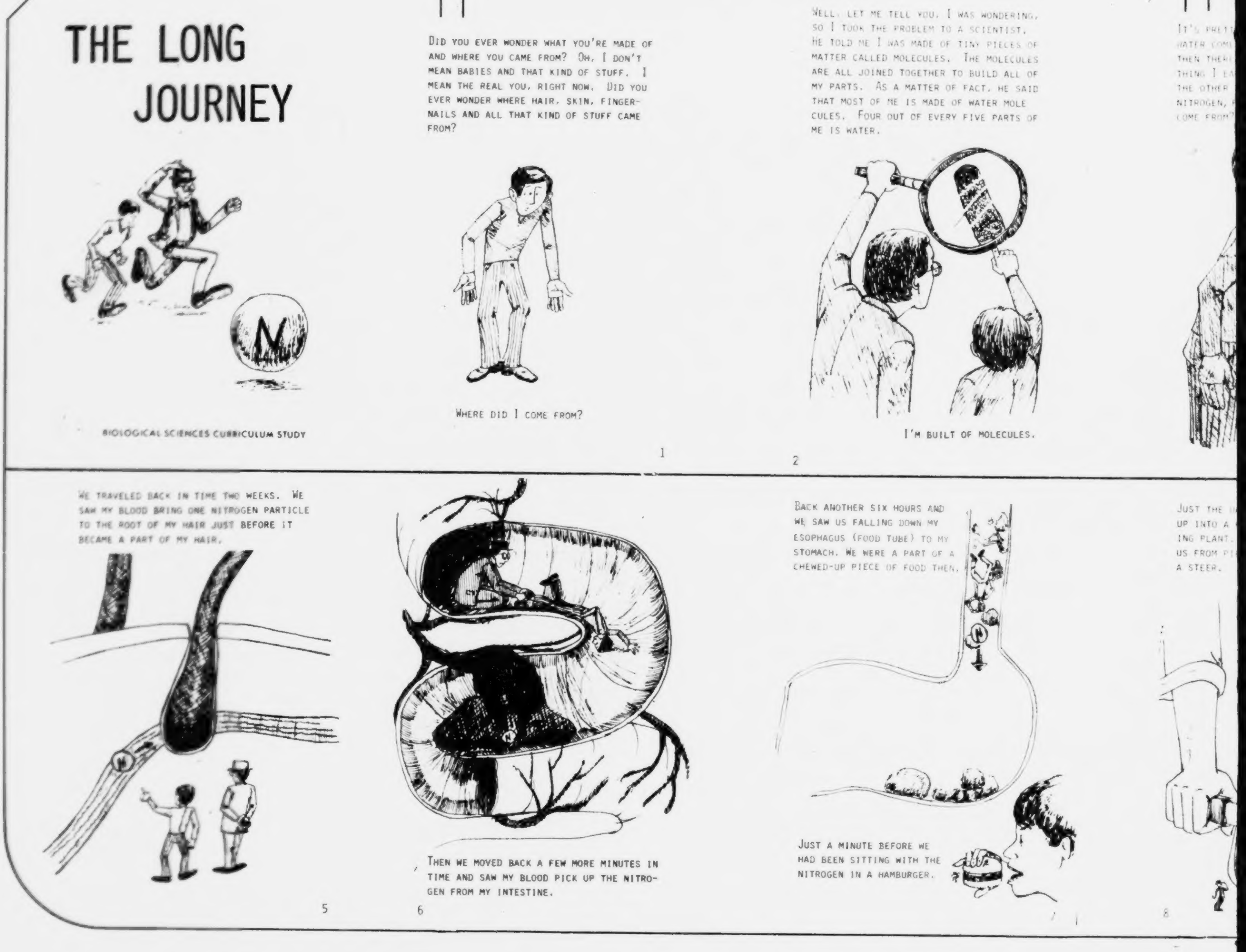
ACTIVITY 4-3
㉒

MATERIALS

TEACHING STRATEGIES

Read the booklet ahead of time so that you can practice use of necessary conversational inflections. The significance of the cartoons should be apparent.

M
s



THE LONG JOURNEY

BIOLOGICAL SCIENCES CURRICULUM STUDY

DID YOU EVER WONDER WHAT YOU'RE MADE OF AND WHERE YOU CAME FROM? OH, I DON'T MEAN BABIES AND THAT KIND OF STUFF. I MEAN THE REAL YOU, RIGHT NOW. DID YOU EVER WONDER WHERE HAIR, SKIN, FINGERNAILS AND ALL THAT KIND OF STUFF CAME FROM?

WHERE DID I COME FROM?

WELL, LET ME TELL YOU. I WAS WONDERING, SO I TOOK THE PROBLEM TO A SCIENTIST. HE TOLD ME I WAS MADE OF TINY PIECES OF MATTER CALLED MOLECULES. THE MOLECULES ARE ALL JOINED TOGETHER TO BUILD ALL OF MY PARTS. AS A MATTER OF FACT, HE SAID THAT MOST OF ME IS MADE OF WATER MOLECULES. FOUR OUT OF EVERY FIVE PARTS OF ME IS WATER.

I'M BUILT OF MOLECULES.

IT'S PRET
WATER COM
THEN THER
THING I EA
THE OTHER
NITROGEN,
COME FROM?

WE TRAVELED BACK IN TIME TWO WEEKS. WE SAW MY BLOOD BRING ONE NITROGEN PARTICLE TO THE ROOT OF MY HAIR JUST BEFORE IT BECAME A PART OF MY HAIR.

THEN WE MOVED BACK A FEW MORE MINUTES IN TIME AND SAW MY BLOOD PICK UP THE NITROGEN FROM MY INTESTINE.

BACK ANOTHER SIX HOURS AND WE SAW US FALLING DOWN MY ESOPHAGUS (FOOD TUBE) TO MY STOMACH. WE WERE A PART OF A CHEWED-UP PIECE OF FOOD THEN.

JUST A MINUTE BEFORE WE HAD BEEN SITTING WITH THE NITROGEN IN A HAMBURGER.

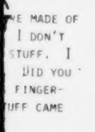
JUST THE
UP INTO A
ING PLANT.
US FROM P
A STEER.

TEACHING STRATEGIES

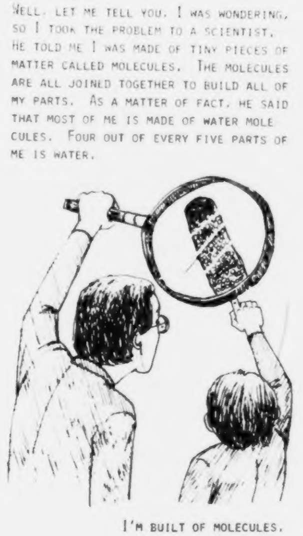
booklet ahead of time so that you can practice
cessary conversational inflections. The signi-
f the cartoons should be apparent.

ANTICIPATED STUDENT BEHAVIORS

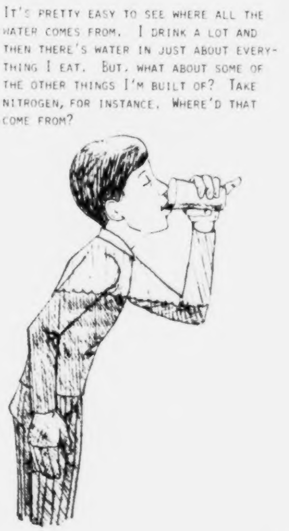
Make sure students understand that the N in the cartoon stands for nitrogen, not north.


E MADE OF
I DON'T
STUFF. I
DID YOU
FINGER-
UFF CAME

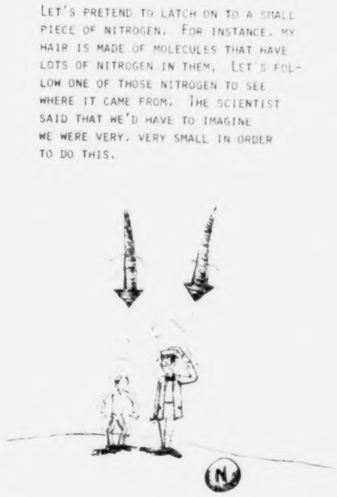
1


WELL, LET ME TELL YOU. I WAS WONDERING, SO I TOOK THE PROBLEM TO A SCIENTIST. HE TOLD ME I WAS MADE OF TINY PIECES OF MATTER CALLED MOLECULES. THE MOLECULES ARE ALL JOINED TOGETHER TO BUILD ALL OF MY PARTS. AS A MATTER OF FACT, HE SAID THAT MOST OF ME IS MADE OF WATER MOLECULES. FOUR OUT OF EVERY FIVE PARTS OF ME IS WATER.
I'M BUILT OF MOLECULES.

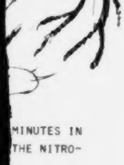
2

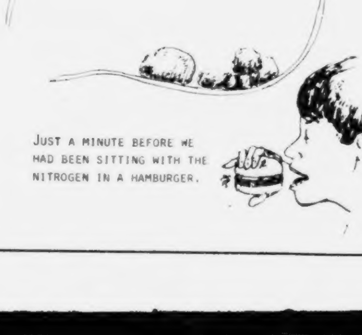

IT'S PRETTY EASY TO SEE WHERE ALL THE WATER COMES FROM. I DRINK A LOT AND THEN THERE'S WATER IN JUST ABOUT EVERYTHING I EAT. BUT, WHAT ABOUT SOME OF THE OTHER THINGS I'M BUILT OF? TAKE NITROGEN, FOR INSTANCE. WHERE'D THAT COME FROM?

3

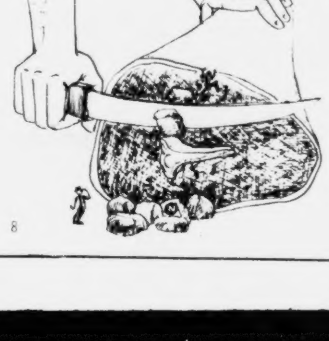

LET'S PRETEND TO LATCH ON TO A SMALL PIECE OF NITROGEN. FOR INSTANCE, MY HAIR IS MADE OF MOLECULES THAT HAVE LOTS OF NITROGEN IN THEM. LET'S FOLLOW ONE OF THOSE NITROGEN TO SEE WHERE IT CAME FROM. THE SCIENTIST SAID THAT WE'D HAVE TO IMAGINE WE WERE VERY, VERY SMALL IN ORDER TO DO THIS.
N

4

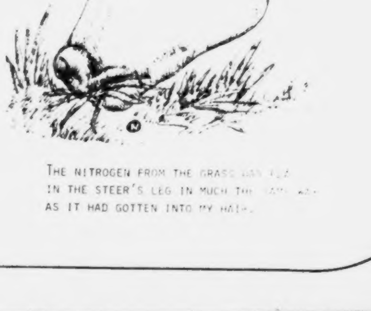

MINUTES IN
THE NITRO-


BACK ANOTHER SIX HOURS AND WE SAW US FALLING DOWN MY ESOPHAGUS (FOOD TUBE) TO MY STOMACH. WE WERE A PART OF A CHEWED-UP PIECE OF FOOD THEN.
N
JUST A MINUTE BEFORE WE HAD BEEN SITTING WITH THE NITROGEN IN A HAMBURGER.

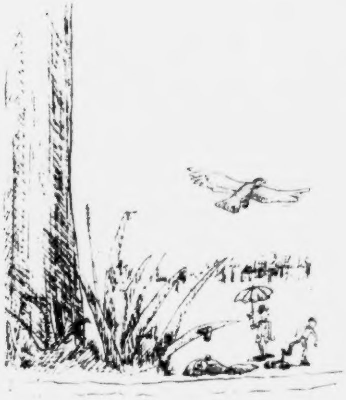
7


JUST THE DAY BEFORE WE HAD BEEN GROUND UP INTO A HAMBURGER AT THE MEAT PACKING PLANT. THE MEAT CUTTER HAD GOTTEN US FROM PIECES OF MUSCLE IN THE LEG OF A STEER.
N

8


THE STEER DIDN'T KNOW IT, BUT IT PICKED UP NITROGEN WHEN IT ATE GRASS JUST BEFORE ITS TRIP TO THE SLAUGHTER HOUSE.
N
THE NITROGEN FROM THE GRASS [illegible] IN THE STEER'S LEG IN MUCH THE SAME WAY AS IT HAD GOTTEN INTO MY HAIR.

MATERIALS

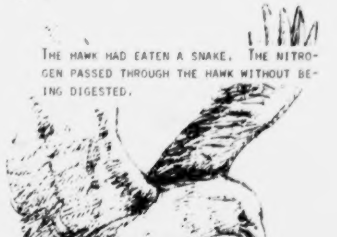


WE WENT BACK TWO MORE WEEKS IN TIME AND SAW THAT THE GRASS HAD GOTTEN THE NITROGEN FROM NATURAL FERTILIZERS. A HAWK HAD BEEN SITTING IN A NEARBY TREE AND ITS DROPPINGS FELL NEAR THE GRASS.

10

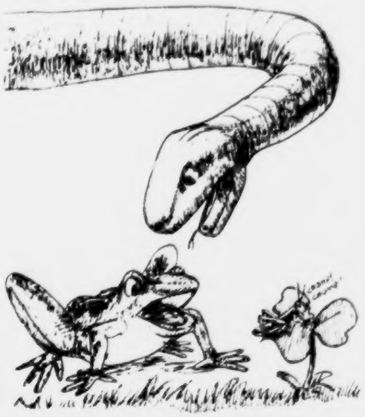
TEACHING STRATEGIES

THE HAWK HAD EATEN A SNAKE. THE NITROGEN PASSED THROUGH THE HAWK WITHOUT BEING DIGESTED.



11

THE SNAKE GOT THE NITROGEN FROM EATING A FROG WHICH HAD EATEN A GRASSHOPPER.



THE GRASSHOPPER HAD GOTTEN THE NITROGEN FROM A BLADE OF CLOVER.

12

AND THE CL
THE SOIL
WE AND THE
THE AIR BY
OF LIGHTNIN
CLOUD.

At this point ask the students to draw a chain representation of *The Long Journey* from the time nitrogen was washed from the air until it ended up in their hair. Ask them to use the pictures of the story to give them clues. The final chain should be representations (word or picture) of the following:

Air → Soil → Clover → Grasshopper

Frog → Snake → Hawk (dropping) → Hay

Steer (hamburger) → Me.

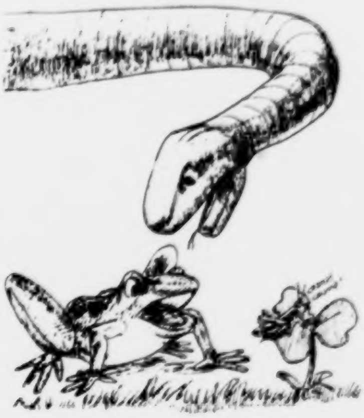
TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

The nitro-
ithout be-

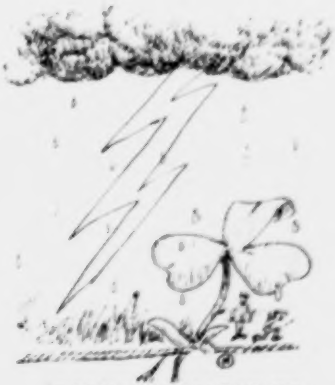
11

HE SNAKE GOT THE NITROGEN FROM EATING
A FROG WHICH HAD EATEN A GRASSHOPPER.



THE GRASSHOPPER HAD GOTTEN THE NITRO-
GEN FROM A BLADE OF CLOVER.

12



AND THE CLOVER GOT THE NITROGEN FROM
THE SOIL JUST AFTER A THUNDERSHOWER.
WE AND THE NITROGEN WERE WASHED FROM
THE AIR BY THE RAIN JUST AFTER A BOLT
OF LIGHTNING STREAKED DOWN FROM A
CLOUD.

13

THE SCIENTIST WAS JUST GETTING WARMED
UP. BUT, I SAID FOLLOWING A BIT OF
NITROGEN ALL THROUGH A FOOD CHAIN WAS
ABOUT ALL I COULD TAKE FOR ONE DAY.
BESIDES I THINK I GOT THE POINT. HOW
ABOUT YOU?

14

point ask the students to draw a chain
ntation of *The Long Journey* from the
trogen was washed from the air until it
in their hair. Ask them to use the
s of the story to give them clues. The
hain should be representations (word or
of the following:

r → Soil → Clover → Grasshopper

g → Snake → Hawk (dropping) → Hay

eer (hamburger) → Me.

UNIT IV, CORE A
Activity 4-3: "The Long Journey: A Review"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		
HARD TO RATE		→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

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	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
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Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did the students have difficulty understanding "The Long Journey" booklet?
(Any misinterpretations, ambiguities, etc.) ☐ No ☐ Yes: Comment.

18. Did students have trouble listing the ten links in the nitrogen chain?
☐ No ☐ Yes: Comment.

19. Concerns (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

ave you answered each question, attached annotated Guide, your revisions, student work, etc.?

IDE A

UNIT IV, CORE A

Activity 4-3: "The Long Journey: A Review"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the followin, list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    c. Realization that certain materials are in finite supply
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

1. Reconstruct the transfer of energy through an environmental system.
2. Conclude that all materials are transferred through environmental systems.

MATERIALS

TEACHING STRATEGIES

Activity 4-4. Food Webs

The food chain transfer of energy and cycling of materials is now expanded into the context of the food web. Students will be given the opportunity to review the concepts associated with analyzing food webs that were just presented in Unit III. Students will later apply these concepts to the environment near your school in Activity 4-6. It is hoped that this will help them to become much more aware of the intricate relationships that exist around them every day.

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

a. Understanding of what a cycle is.

b. Understanding of the role of decomposers.

c. Realization that certain materials are in finite supply.

d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part of nature, not apart from nature.

BJECTIVES:

Reconstruct the transfer of energy through an environmental system.

Conclude that all materials are transferred through environmental systems.

TEACHING STRATEGIES

. Food Webs

in transfer of energy and cycling of materials
ded into the context of the food web.
l be given the opportunity to review the
ociated with analyzing food webs that were
ed in Unit III. Students will later apply
ts to the environment near your school in
. It is hoped that this will help them to
more aware of the intricate relationships
round them every day.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE A. ENERGY AND MATERIAL TRANSFER

ACTIVITY 4-4. FOOD WEBS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- *--have participated in the food web string activity and played the role of an organism appropriately.*
- *--have identified appropriate food chains and food web interactions.*
- *--have realized that a disturbance in any part of the food web will ultimately be felt in the whole food web.*

ACTIVITY 4-4
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MATERIALS

1 Deck of food web flash cards
*Large ball of string
*Scissors

*Not furnished in materials kit

TEACHING STRATEGIES

Teacher Preparation:

1. Arrange the chairs or desks in a large circle facing toward the center of the classroom before students arrive.

2. Prior to the organizing of the class have the materials outlined in the materials list available.

Begin the activity by having each student draw a flash card from the flash card deck. Explain that each student will pretend he is the organism he draws from the deck. Have each student hold the card so that all students sitting in the circle can see all of the cards.

Start by saying:

> EACH OF YOU IS PRETENDING TO BE ONE KIND OF LIVING THING -- THE ORGANISM PICTURED ON THE CARD YOU ARE HOLDING. (Student's name), YOU ARE ALL OF THE SNAKES IN THE AREA. (Student's name), YOU ARE THE WHOLE POPULATION OF MOSQUITOES.

Ask:

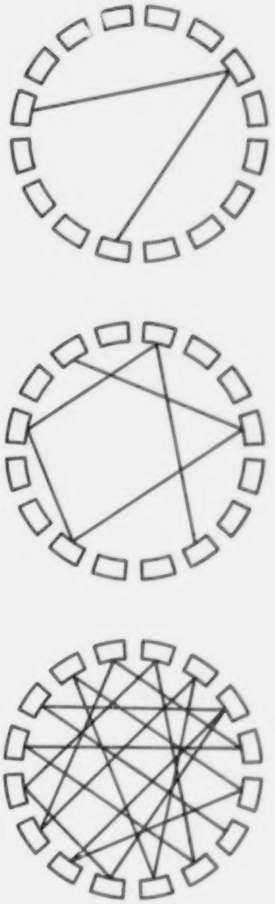
> DO ANY OF YOU SEE AN ORGANISM THAT YOU, AS THE ORGANISM YOU'RE PRETENDING TO BE, WOULD NORMALLY EAT?

Pick a volunteer and have him identify the organism he is pretending to be and then identify one he eats. Have him hold on to the end of the ball of string until told to let go. Stretch the string from this organism (student) to the organism (student) that it eats. Have the second organism (student) hold on to the string. Then ask that organism (student) to identify an organism that it might eat. If the student can not identify a food source, have the class

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
paration:	
ge the chairs or desks in a large circle facing d the center of the classroom before students e.	
to the organizing of the class have the ials outlined in the materials list available.	
ctivity by having each student draw a flash he flash card deck. Explain that each student d he is the organism he draws from the deck. tudent hold the card so that all students he circle can see all of the cards.	
ying:	
YOU IS PRETENDING TO BE ONE KIND OF THING -- THE ORGANISM PICTURED ON THE U ARE HOLDING. (Student's name), YOU OF THE SNAKES IN THE AREA. (Student's YOU ARE THE WHOLE POPULATION OF MOSQUITOES.	
OF YOU SEE AN ORGANISM THAT YOU, AS THE M YOU'RE PRETENDING TO BE, WOULD NORMALLY EAT?	--should recall the food chain game and identify organisms they would normally eat.
nteer and have him identify the organism he is o be and then identify one he eats. Have him he end of the ball of string until told to let the string from this organism (student) to the udent) that it eats. Have the second organism ld on to the string. Then ask that organism identify an organism that it might eat. If can not identify a food source, have the class	--should hold string appropriately.

MATERIALS

Diagram 4-1



TEACHING STRATEGIES

help him. When a food source is identified, stretch the string to the new food source played by a third student. Continue identifying food sources until you reach a dead end in your food chain. (See Diagram 4-1.) Ask at this point:

WHAT HAVE WE MADE?

Then cut the string and start a new food chain starting with a student who is not yet in the food chain. Continue with this procedure until a maze of string is created between the students, i.e., until a complex food web is created. Remember that only one student can play the role of any specific organism, so most students will be joined to the others by more than one string.

Then ask:

WHAT HAVE WE MADE NOW?

HOW DOES THIS DIFFER FROM A FOOD CHAIN?

> If students cannot answer the previous question, ask:
>
> DOES A SPIDER WEB LOOK ANYTHING LIKE WHAT WE HAVE MADE?
>
> WHAT WOULD BE A GOOD NAME FOR WHAT WE HAVE MADE?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ien a food source is identified, stretch the new food source played by a third student. tifying food sources until you reach a dead ood chain. (See Diagram 4-1.) Ask at	
E WE MADE?	--respond, "Food chain."
string and start a new food chain starting t who is not yet in the food chain. Continue cedure until a maze of string is created tudents, i.e., until a complex food web is ember that only one student can play the pecific organism, so most students will be others by more than one string.	
E WE MADE NOW?	--recall and respond, "Food web."
THIS DIFFER FROM A FOOD CHAIN?	--inspect the model and realize that the web is more complex than a chain and that it is in fact made up of many chains.
students cannot answer the previous stion, ask:	
S A SPIDER WEB LOOK ANYTHING LIKE WHAT HAVE MADE?	--should notice the similarity and respond, "Yes."
T WOULD BE A GOOD NAME FOR WHAT WE HAVE E?	--should associate spider web with class activity and respond, "Food Web."

MATERIALS

TEACHING STRATEGIES

Now continue and say:

> A GROUP OF FOOD CHAINS CONNECTED TOGETHER LIKE THESE WE HAVE MADE HERE IS CALLED A FOOD WEB. WHY DO YOU SUPPOSE IT'S CALLED THAT?
>
> HOW DOES A FOOD WEB DIFFER FROM A FOOD CHAIN?
>
> WHAT DOES A FOOD WEB SHOW US THAT A FOOD CHAIN DOES NOT?

When students have a basic appreciation of the complex nature of the food interactions of the organisms in the food web, proceed with the following: Pick the student who has the most strings in his hand and make up a disastrous situation relating to the organism that student is pretending to be; the situation should be as lifelike as possible. Examples might be; a drought hits an area and wipes out the grain population for a year; hunters shoot all of the hawks in an area; an insecticide kills all of the mosquitoes, etc.

After describing the disaster, have that student and that student only drop the strings in his hand. Then have all of the organisms that are directly affected (holding the other end of those strings) drop their strings. Then have all those that are affected by the second release drop theirs, etc. All the strings should be so interconnected that all or nearly all of the students will have dropped their strings. After this has occurred say:

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
e and say:	Students:
P OF FOOD CHAINS CONNECTED TOGETHER IESE WE HAVE MADE HERE IS CALLED A FOOD WEB. YOU SUPPOSE IT'S CALLED THAT?	--should propose various reasons and should include the tangled aspect of interconnecting pathways.
ES A FOOD WEB DIFFER FROM A FOOD CHAIN?	--compare the two and indicate that a food web is a network of many interconnecting chains, while a food chain is merely a single pathway of energy flow.
DES A FOOD WEB SHOW US THAT A FOOD CHAIN DT?	--should compare the two and emphasize the complexity of the food web. This might be expressed as, "More strings," "Harder," etc.
s have a basic appreciation of the complex e food interactions of the organisms in the oceed with the following: Pick the student most strings in his hand and make up a ituation relating to the organism that retending to be; the situation should be as possible. Examples might be; a drought and wipes out the grain population for a s shoot all of the hawks in an area; an kills all of the mosquitoes, etc. bing the disaster, have that student and that drop the strings in his hand. Then have all isms that are directly affected (holding the those strings) drop their strings. Then se that are affected by the second release etc. All the strings should be so inter- at all or nearly all of the students will their strings. After this has occurred	

MATERIALS

TEACHING STRATEGIES

REMEMBER, EACH OF YOU IS PRETENDING TO BE ALL OF ONE KIND OF THING. (Student's name), IS THE ENTIRE (grain) POPULATION.

WHAT DID A CHANGE IN THE (grain) POPULATION DO TO OUR FOOD WEB?

HOW ARE ALL THE ORGANISMS IN A FOOD WEB RELATED?

DOES IT MATTER IF SOMETHING HAPPENS TO ONE POPULATION IN A FOOD WEB?

WHY DOES IT MATTER?

HOW DOES IT AFFECT OTHER POPULATIONS?

You may have to ask what effect it will have on one prey population if a second prey population has been wiped out. The answer is that the predator will of necessity concentrate on the remaining prey species because it becomes the predator's only source of food.

ARE PEOPLE IN FOOD WEBS?

ARE WE AFFECTED IF OTHER POPULATIONS IN OUR FOOD WEB ARE AFFECTED?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
BER, EACH OF YOU IS PRETENDING TO BE F ONE KIND OF THING. (Student's name), E ENTIRE (grain) POPULATION.	
ID A CHANGE IN THE (grain) POPULATION DO R FOOD WEB?	--should conclude from the string experience that it "Goofed up the whole works."
E ALL THE ORGANISMS IN A FOOD WEB RELATED?	--should realize that all the organisms are interconnected in a food web.
T MATTER IF SOMETHING HAPPENS TO ONE POPULATION OOD WEB?	--respond, "Yes."
ES IT MATTER?	--infer that a change in one population in a food web affects all the other populations.
ES IT AFFECT OTHER POPULATIONS?	--infer that as one population is reduced (or increased), shifts in the numbers of other populations compensate for the loss or increase.
e to ask what effect it will have on one tion if a second prey population has been . The answer is that the predator will y concentrate on the remaining prey species becomes the predator's only source of food.	
OPLE IN FOOD WEBS?	--respond, "Yes."
AFFECTED IF OTHER POPULATIONS IN OUR FOOD E AFFECTED?	--infer that man is affected by changes in his food web.

UNIT IV, CORE A
Activity 4-4: "Food Webs"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ____

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

HIGH INTEREST → ________ ________ ________ ________

STRONG DISLIKE → ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☑ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

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Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did students have difficulty understanding what was meant by the terms 'organism' and 'population'? ☐ No ☐ Yes: Comment.

18. Did you use the terms 'prey' and 'predator' (and did students understand them)?
☐ Yes ☐ No: Comment.

19. Were there any students who could not explain the effect of a change in one population on the other populations in the ecosystem? ☐ No ☐ Yes: Comment.

20. Concern (or questions) about content:

21. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE A
Activity 4-4: "Food Webs"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

- ☐ how you organized materials or class.
- ☐ things added (a question, a picture, etc.).
- ☐ equipment, supplies, visual aids.
- ☐ things that went wrong, misunderstandings.
- ☐ what you would do differently or avoid next time.

THE STUDENTS

- ☐ who had problems and what they were.
- ☐ how someone "caught on" (or who never did).
- ☐ who was really "turned off" (or on).
- ☐ reactions of parents, teachers, students.
- ☐ special evidence of learning or applying ideas.

- ☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   - a. Understanding of what a cycle is.
   - b. Understanding of the role of decomposers.
   - c. Realization that certain materials are in finite supply.
   - d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

1. Reconstruct the transfer of energy through an environmental system.
2. Conclude that all materials are transferred through environmental systems.

MATERIALS	TEACHING STRATEGIES
	Activity 4-5. Plant And Animal Hunt *This activity will introduce/reacquaint students with some plants and animals in their area. The plants and animals identified will be used to construct another food web of string in Activity 4-6. Because the plants and animals will be familiar to the students, this food web will provide a more concrete model then the previous one.*

OCUS FOR THIS ACTIVITY

OALS:

. Appreciate the cycling relationships of the materials and organisms in the environment through:

  a. Understanding of what a cycle is.

  b. Understanding of the role of decomposers.

  c. Realization that certain materials are in finite supply.

  d. Recognition of examples of man's impact upon the environment.

. Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

. Reconstruct the transfer of energy through an environmental system.

. Conclude that all materials are transferred through environmental systems.

TEACHING STRATEGIES

5. Plant And Animal Hunt

ty will introduce/reacquaint students with some animals in their area. The plants and animals will be used to construct another food web of ctivity 4-6. Because the plants and animals iliar to the students, this food web will ore concrete model then the previous one.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE A. ENERGY AND MATERIAL TRANSFER

ACTIVITY 4-5. PLANT AND ANIMAL HUNT

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have identified several plants and animals found in his area.

--have seen and identified plants and animals from other parts of the country.

ACTIVITY 4-5

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MATERIALS

*File cards, (6" X 8"), 2 per student
*Crayons, colored pencils
*Magazines with pictures of local organisms
*Scissors, 1 per pair of students

*Not furnished in materials kit

TEACHING STRATEGIES

Prior to this activity you will want to locate a convenient outdoor place where you can take your class for this field trip. It should be as rich in plant and animal life as possible. Places that may be good for the purpose include parks, zoos, fields, or woods.

Begin this activity by asking:

IF WE WANTED TO TAKE A SHORT TRIP TO FIND A LOT OF PLANTS AND ANIMALS, WHERE COULD WE GO?

As each place is suggested ask the following questions:

WILL THERE BE A LOT OF PEOPLE THERE?

WHO OWNS IT?

DO WE NEED PERMISSION TO GO ON THAT PROPERTY? WHY OR WHY NOT?

CAN WE GET A GUIDE OR EXPERT TO HELP US?

Discuss all the various areas that could be visited and eventually arrive at as much of a universal agreement as is possible. Try not to dictate the spot -- let students discuss the problem and weigh all the considerations.

A place within easy walking distance is obviously preferable unless you can easily get a bus or other transportation. If no obvious place is available, the school grounds can be used as a last resort. The main reason for not using the school grounds is that students will miss a chance to explore an area that is not as familiar as the school yard. When the place has been established, continue by asking:

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
is activity you will want to locate a convenient ce where you can take your class for this field hould be as rich in plant and animal life as Places that may be good for the purpose include , fields, or woods.	
activity by asking:	
WANTED TO TAKE A SHORT TRIP TO FIND A PLANTS AND ANIMALS, WHERE COULD WE GO?	--should call on their experience and suggest a place.
ce is suggested ask the following questions:	
HERE BE A LOT OF PEOPLE THERE?	--should guess appropriately.
NS IT?	--should relay their knowledge or guesses.
NEED PERMISSION TO GO ON THAT PROPERTY? WHY NOT?	--should discuss private or public places and decide appropriately for each.
GET A GUIDE OR EXPERT TO HELP US?	--should discuss the possibility.
the various areas that could be visited and arrive at as much of a universal agreement as . Try not to dictate the spot -- let students problem and weigh all the considerations.	
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MATERIALS

TEACHING STRATEGIES

WHEN WE VISIT THE (place) WHAT KINDS OF PLANTS AND ANIMALS DO YOU THINK WE WILL FIND?

As students make suggestions, write them on the board under two columns, "Plant" and "Animal". If there is any confusion about what is plant or animal, it should be clarified at this time. Students may not think of a fish, a bird, or an insect as an animal, for example. If this problem arises, it would be a good time to review the grouping work done earlier. Explain that animals can be grouped into categories based on common characteristics. For example, birds fly and have feathers, and thus we classify them as birds. Besides being animals, they are classified as birds. Continue this kind of exploration until the students understand that all such organisms are animals.

The students should be allowed to comment on other students' suggestions. Let them agree or disagree with a suggestion and explain why they agree or disagree. The tendency should be to include all suggestions unless they are obviously incorrect.

If the space on the chalkboard is not needed for several days, the list can be left on the board. If the space is needed, some student in the class should be appointed recorder and should copy the list for a permanent record.

The day of the field trip:

If the weather is bad, postpone the field trip and see Activity 4-7 for an alternate lesson.

Briefly review with the students the conduct you expect from them on the field trips.

St

--

TEACHING STRATEGIES

VISIT THE (place) WHAT KINDS OF PLANTS
MALS DO YOU THINK WE WILL FIND?

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e field trip:

r is bad, postpone the field trip and 4-7 for an alternate lesson.

w with the students the conduct you expect the field trips.

ANTICIPATED STUDENT BEHAVIORS

Students:

--should use their experiences in the area to make logical predictions.

ACTIVITY 4-5

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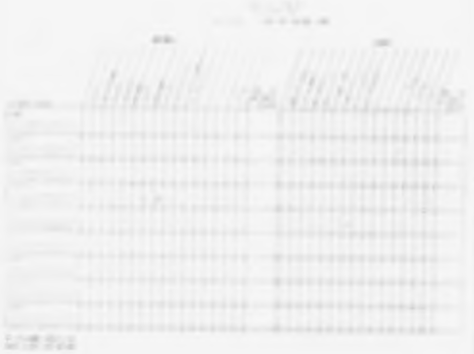
MATERIALS

Diagram 4-2



TEACHING STRATEGIES

NOTE TO TEACHERS:

The students should be paired by the teacher for the trip, and should then be told that each group (pair) should report at least five plants and five animals from the area to the teacher. They must tell the teacher the name of each organism and whether or not it is a plant or animal. If the teacher questions the presence of that organism, she can ask to see it or for the indirect evidence of the organism named. Encourage students to spread out and find as many organisms as possible. Encourage the collection of indirect evidence also! Such evidence might be a feather, a bone, hair, acorn, leaf, etc.

Record the names of the two students in each team on Tallysheet 4-2 and take it along on the field trip to check off plants and animals each team finds. If you supply the name of the organism, make an asterisk in the appropriate column for that team. (See Diagram 4-2.)

While duplication should be allowed in organisms listed, strive to obtain variety by asking students to bring in more names if they all select the same organisms.

Some teams may have difficulty supplying the specific names of animals such as robin or hawk, in which case you can use a group name as a category, such as birds or bugs. The same will be true of plants. (Of course students should be free to ask each other what something is or to ask you. You may wish to take along a key to flowers, trees, birds, or insects. You may also wish to extend this lesson to show students how to use such guides. If the students find something that stumps everyone, they may wish to take a picture of it and ask a local expert to identify it.

TEACHING STRATEGIES

CHERS:

s should be paired by the teacher for the trip,
then be told that each group (pair) should
east five plants and five animals from the
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to show students how to use such guides. If
find something that stumps everyone, they
take a picture of it and ask a local expert to

ANTICIPATED STUDENT BEHAVIORS

MATERIALS	TEACHING STRATEGIES

MUCH TRIP TIM

Day after the field trip:

In this part of the activity, students will compare their predictions with their actual findings. Either their predictions will be verified, in which case you should congratulate them, or their findings will be more or less than they predicted.

Back in the classroom the day after the field trip, write the list of plants and animals seen on the trip on the chalkboard next to the list of those listed before the field trip. Circle the names of any organisms which occur on one list but not on the other. If someone suggested before the field trip that a robin might be seen, but no robin was reported, circle robin. Both lists could be placed on the chalkboard before the class comes in and when the class is assembled the teacher could ask:

WHY ARE SOME NAMES CIRCLED?

Or the lists could be written on the chalkboard and the words circled while the students are present and the same question asked.

Ask whichever of the following questions is appropriate or both:

WHY DID WE SEE SOME ORGANISMS WHICH DIDN'T APPEAR ON THE FIRST LIST?

or

A

St

--r
i
c

TEACHING STRATEGIES

MUCH TRIP TIME

e field trip:

of the activity, students will compare their
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will be verified, in which case you should
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SOME NAMES CIRCLED?

could be written on the chalkboard and the
d while the students are present and the same
ed.

r of the following questions is appropriate or

WE SEE SOME ORGANISMS WHICH DIDN'T APPEAR
FIRST LIST?

ANTICIPATED STUDENT BEHAVIORS

Students:

--respond, "I don't know," "Because they are important," "Because they are missing from the other list."

MATERIALS

TEACHING STRATEGIES

WHY DIDN'T WE SEE ALL OF THE ORGANISMS WE THOUGHT WE WOULD SEE?

Ask:

WHY WERE SOME ORGANISMS SEEN BY MORE STUDENTS THAN OTHERS?

Now discuss each organism seen on the trip. Ask questions such as:

WHAT IS THE (organism) LIKE?
WHAT DOES IT EAT?
WHY CAN IT LIVE AT THE (place)?
WHAT DOES IT DO IN THE AREA?

If possible the list of organisms seen on the trip should be left on the chalkboard for the next day of class.

Discuss all responses that may arise. Summarize with a comment that now the class is going to prepare for a game that will use the names and a drawing of the organisms the students reported from the trip.

Give each student two 6 X 8 inch cards and assign him to draw a simple, colored picture of an assigned plant on one card and to label the drawing with the name of the plant in black at the bottom of the card; then to draw an assigned animal and label it on the other card. Have the students print the labels in large letters. Be sure that

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
N'T WE SEE ALL OF THE ORGANISMS WE WE WOULD SEE?	--respond, "I don't know," "Some were asleep," "Some were dead," "Some only spend part of their time there," "They were there but we just missed them," "We made a mistake."
E SOME ORGANISMS SEEN BY MORE STUDENTS HERS?	--respond, "Some students see better than others," "Students were in different places at the same time," "Some of the organisms moved out of the area, thus were seen by some students and not by others," "Some students thought some organisms were more important than others, so reported them first," "Some organisms were more numerous, and so were seen and reported by more students."
each organism seen on the trip. Ask questions THE (organism) LIKE? ES IT EAT? IT LIVE AT THE (place)? ES IT DO IN THE AREA?	--provide information as their background allows.
the list of organisms seen on the trip should he chalkboard for the next day of class.	
responses that may arise. Summarize with a now the class is going to prepare for a game e the names and a drawing of the organisms reported from the trip.	
udent two 6 X 8 inch cards and assign him to e, colored picture of an assigned plant on one label the drawing with the name of the plant the bottom of the card; then to draw an mal and label it on the other card. Have the nt the labels in large letters. Be sure that	

MATERIALS

TEACHING STRATEGIES

a card is made for each plant and animal. If there are not enough organisms for each student to make two cards, have duplicate cards made.

WORK TIME

If students are reluctant to draw or cannot draw, then provide magazines from which pictures of the organisms can be found. Have them cut them out on the cards and label them. In a few cases you may want some student to photograph an organism.

WORK TIME

Collect the cards when they are completed and have them available for distribution to the students for the string game in the next activity.

TEACHING STRATEGIES

de for each plant and animal. If there are rganisms for each student to make two cards, te cards made.

WORK TIME

are reluctant to draw or cannot draw, then zines from which pictures of the organisms . Have them cut them out on the cards em. In a few cases you may want some hotograph an organism.

WORK TIME

cards when they are completed and have them r distribution to the students for the string next activity.

ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE A
Activity 4-5: "Plant And Animal Hunt"

Teacher

Activity name suggested by class:

BSCS USE: Post ___ Tally ___ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ______ ______ ______ ______
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		
HARD TO RATE		→ ______ ______ ______ ______

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did students have difficulty identifying the names of plants or animals found in the area? ☐ No ☐ Yes: Comment.
[NOTE: Be sure to send in Tallysheet 4-2 showing organisms they observe.]

18. Did the field trip go smoothly with no problems?
☐ Yes ☐ No: Comment.

19. Did any students have difficulty picturing their plant and animal?
☐ No ☐ Yes: Comment.

20. Concern (or questions) about content:

21. Messages for staff (read immediately):

ave you answered each question, attached annotated Guide, your revisions, student work, etc.?

IDE A

BSCS Evaluation: EMH Feedback Form 1c

UNIT IV, CORE A
Activity 4-5: "Plant And Animal Hunt"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

UNIT IV, CORE A
TALLYSHEET 4-2
ACTIVITY 4-5: PLANT AND ANIMAL HUNT

	ANIMALS																			
STUDENT PAIRS																	No. of animals found			
Team 1 ____________ ____________																				
Team 2 ____________ ____________																				
Team 3 ____________ ____________																				
Team 4 ____________ ____________																				
Team 5 ____________ ____________																				
Team 6 ____________ ____________																				
Team 7 ____________ ____________																				
Team 8 ____________ ____________																				
Team 9 ____________ ____________																				
# of teams reporting each plant and animal																				

ANIMALS											No. of animals found	PLANTS															No. of plants found

Send this sheet in with the Activity 5 Feedback Form.

UNIT IV, CORE A
TALLYSHEET 4-2
ACTIVITY 4-5: PLANT AND ANIMAL HUNT

STUDENT PAIRS	ANIMALS																No. of animals found		
Team 1																			
Team 2																			
Team 3																			
Team 4																			
Team 5																			
Team 6																			
Team 7																			
Team 8																			
Team 9																			

# of teams reporting
each plant and animal

ANIMALS												PLANTS															
											No. of animals found																No. of plants found

Send this sheet in with the Activity : Feedback Form.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    c. Realization that certain materials are in finite supply.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

1. Reconstruct the transfer of energy through an environmental system.
2. Conclude that all materials are transferred through environmental systems.

MATERIALS	TEACHING STRATEGIES
	Activity 4-6. Tying Up The Hunt *This activity is designed to show various relationships between the plants and animals found in the students' environment. It will also reinforce the concept that a disruption in a community of organisms will ultimately affect all organisms in that community.*

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

a. Understanding of what a cycle is.

b. Understanding of the role of decomposers.

c. Realization that certain materials are in finite supply.

d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

Reconstruct the transfer of energy through an environmental system.

Conclude that all materials are transferred through environmental systems.

UNIT IV.	TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT
CORE A.	ENERGY AND MATERIAL TRANSFER
ACTIVITY 4-6.	TYING UP THE HUNT

BSCS

TEACHING STRATEGIES

. Tying Up The Hunt

ty is designed to show various relationships
plants and animals found in the students'
. It will also reinforce the concept that
in a community of organisms will ultimately
rganisms in that community.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have identified appropriate food chain and food web interactions for the local flora (plants) and fauna (animals).

--have played the role of a local plant population or animal population in the food web game.

--conclude that food web relationships are complex and that changes in one aspect of the web will ultimately affect the whole web.

ACTIVITY 4-6

MATERIALS

*Cards prepared in Activity 4-5
*Ball of string
*Scissors

*Not furnished in materials kit

TEACHING STRATEGIES

The strategy of this activity should follow exactly that in Activity 4-4, Food Webs. Give each student a card that corresponds to a plant or animal identified on the field trip. Have students arrange themselves in a circle as they did in Activity 4-4 and hold the cards so the other students can see them. Now continue with the exact strategy you followed in Activity 4-4, the only difference being that you will use local plants and animals.

Make sure you bring out these important points again:

1. What eats what, i.e., all the possible food chains.

2. How the food chains overlap to form a very complex maze, a food web.

3. How a disaster in one population of a food web will ultimately affect the entire food web.

Try to give this activity as much local flavor and reality as you can!

TEACHING STRATEGIES

gy of this activity should follow exactly that
y 4-4, Food Webs. Give each student a card
sponds to a plant or animal identified on the
. Have students arrange themselves in a circle
d in Activity 4-4 and hold the cards so the
ents can see them. Now continue with the exact
ou followed in Activity 4-4, the only differ-
that you will use local plants and animals.

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hains.

ow the food chains overlap to form a very
omplex maze, a food web.

ow a disaster in one population of a food
eb will ultimately affect the entire food
eb.

e this activity as much local flavor and reality
!

ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE A
Activity 4-6: "Tying Up The Hunt"

Teacher

BSCS USE: Post ____ Tally ____ Rev ___

Activity name suggested by class:

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)				
HIGH INTEREST		→ ________	________	________	________
MODERATE INTEREST					
INDIFFERENCE					
MODERATE RESISTANCE					
STRONG DISLIKE		→ ________	________	________	________
HARD TO RATE					

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

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	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
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10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

---

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did the students remember the other food web they made and understand what would happen? ☐ Yes ☐ No: Comment.

18. Did students have trouble deciding what local organisms ate?
☐ No ☐ Yes: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE A
Activity 4-6: "Tying Up The Hunt"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

- ☐ how you organized materials or class.
- ☐ things added (a question, a picture, etc.).
- ☐ equipment, supplies, visual aids.
- ☐ things that went wrong, misunderstandings.
- ☐ what you would do differently or avoid next time.

THE STUDENTS

- ☐ who had problems and what they were.
- ☐ how someone "caught on" (or who never did).
- ☐ who was really "turned off" (or on).
- ☐ reactions of parents, teachers, students.
- ☐ special evidence of learning or applying ideas.

- ☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    c. Realization that certain materials are in finite supply.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

1. Reconstruct the transfer of energy through an environmental system.
2. Conclude that all materials are transferred through environmental systems.

MATERIALS	TEACHING STRATEGIES
	Activity 4-7. Hunting In Other Areas *This activity is designed to show students some environments in this country other than the one they visit. It will allow them to predict what it is like in environments they may have never been in. Students will also relate obvious environmental conditions to the plants and animals of an area.*

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

a. Understanding of what a cycle is.

b. Understanding of the role of decomposers.

c. Realization that certain materials are in finite supply.

d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part *of* nature, not apart *from* nature.

BJECTIVES:

Reconstruct the transfer of energy through an environmental system.

Conclude that all materials are transferred through environmental systems.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE A. ENERGY AND MATERIAL TRANSFER

ACTIVITY 4-7. HUNTING IN OTHER AREAS

BSCS

TEACHING STRATEGIES

Hunting In Other Areas

is designed to show students some
in this country other than the one they
ll allow them to predict what it is
onments they may have never been in.
also relate obvious environmental condi-
plants and animals of an area.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--observe a series of slides on various environments.
--participate in a discussion of the various environments.
--make predictions about the environmental components of the unknown environments.

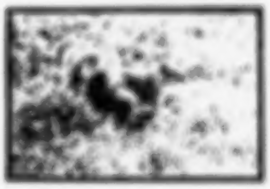
ACTIVITY 4-7

㊷

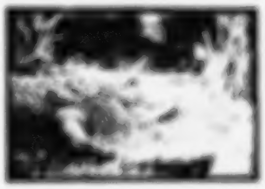
MATERIALS

Slide 4-3

Slide 4-4



Slide 4-5



TEACHING STRATEGIES

Note to teacher:

This activity is really designed to give you some flexibility in your field trip in Activity 4-5, should inclement weather occur. If the weather is bad on the day of the planned trip, the set of slides can be shown, and the strategy outlined followed. Then if the weather clears the trip can be taken the next day. It will not solve the problem of prolonged inclement weather, but it will give you one day's flexibility for the trip. If this activity is not substituted for the field trip, you should use it after the field trip unless you are behind schedule.

Discussion should accompany these slides. The students should be asked to think of other organisms they might expect to find in each area besides those organisms actually seen in the slide. This ties in with the idea that there may be other organisms in the area the class visits which may not be seen at the time the class is there. There may also be indirect evidence of some organisms, and the teacher may wish to include these animals -- for example, a feather from a cardinal. The students should decide at this time whether or not they want to include indirect evidence for listing an organism in the area actually visited.

As each slide is shown, ask this series of questions:

WHERE DO YOU THINK THIS PICTURE WAS TAKEN?
WHY DO YOU THINK SO?

WHAT PLANTS DO YOU SEE?

WHAT ANIMALS DO YOU SEE?

TEACHING STRATEGIES

cher:

y is really designed to give you some
in your field trip in Activity 4-5, should
eather occur. If the weather is bad on
the planned trip, the set of slides can
nd the strategy outlined followed. Then
her clears the trip can be taken the next
ll not solve the problem of prolonged incle-
r, but it will give you one day's flexibility
r. If this activity is not substituted for
rip, you should use it after the field trip
are behind schedule.

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and the teacher may wish to include these
for example, a feather from a cardinal. The
ould decide at this time whether or not
include indirect evidence for listing
in the area actually visited.

e is shown, ask this series of questions:

O YOU THINK THIS PICTURE WAS TAKEN?
YOU THINK SO?

LANTS DO YOU SEE?

NIMALS DO YOU SEE?

ANTICIPATED STUDENT BEHAVIORS

Students:

--use their knowledge to guess the locations of the pictures and tell what they used as clues.

--name plants.

--name animals.

MATERIALS

Slide 4-6

Slide 4-7

Slide 4-8

TEACHING STRATEGIES

IS THIS PLACE LIKE THE PLACE WE WILL VISIT (VISITED)?

WHAT OTHER PLANTS (ANIMALS) DO YOU SUPPOSE LIVE AT THIS PLACE? WHY? HOW DO YOU KNOW?

WHAT IS THE WEATHER LIKE AT THIS PLACE?

WHAT DO THE ANIMALS IN THE PICTURE EAT? WHAT EATS THEM?

COULD YOU LIVE AT THIS PLACE? WHY? WHY NOT?

After all slides are shown and students have discussed the various environments, ask:

WHICH ANIMALS (PLANTS) THAT WE SAW DO YOU THINK WE COULD FIND WHERE WE LIVE?

WHICH ONES COULD WE NOT FIND IN OUR AREA? WHY?

NOTE: For your information, just a few examples of plants and animals are listed that might be found in the areas shown in the slides. If students do not give any responses to the questioning, they might react to these examples.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
PLACE LIKE THE PLACE WE WILL VISITED)?	--respond, "No," "Yes."
HER PLANTS (ANIMALS) DO YOU SUPPOSE THIS PLACE? WHY? HOW DO YOU KNOW?	--relate experience and knowledge to predict what other plants and animals live there.
THE WEATHER LIKE AT THIS PLACE?	--speculate about the climate of the place.
THE ANIMALS IN THE PICTURE EAT? WHAT EM?	--describe possible food sources of animals described.
OU LIVE AT THIS PLACE? WHY? WHY NOT?	--speculate on their life needs and decide if the pictured environment could satisfy those needs.
ides are shown and students have discussed environments, ask:	
NIMALS (PLANTS) THAT WE SAW DO YOU E COULD FIND WHERE WE LIVE?	--identify local plants and animals as much as possible.
NES COULD WE NOT FIND IN OUR AREA? WHY?	--identify those plants and animals not found in the local area and give reasons why not, such as "No food," "Too large," "Too cold," "Too wet," "Too dry," "Too many people," etc.
our information, just a few examples ants and animals are listed that be found in the areas shown in the s. If students do not give any responses e questioning, they might react to these les.	

ACTIVITY 4-7

MATERIALS

Slide 4-9

TEACHING STRATEGIES

	Plants	Animals
4-3	Water Plants	Crayfish, Frogs, Snails, Hellgrammite (Dobsonfly Larva)
4-4	Oak Tree, Maple Tree, Sycamore, Bushes, Shrubs, Flowers	Pigeon, Man, Robin, Sparrow, Dog
4-5	Cypress, Spanish Moss, Mangroves, Lilies	Snake, Deer, Turtle
4-6	Pines, Grass, Aspen, Fir, Mosses, Ferns Berries	Deer, Bear, Cougar, Bobcat, Wolf
4-7	Grass, Sage Brush, Bushes	Jackrabbit, Prairie Dog, Fox, Coyote, Deer
4-8	Cactus, Yucca, Chaparral, Sage Brush	Fox, Rattle Snake, Gerbil, Owl
4-9	Grass, Trees, Shrubs, Flowers	Lion, Zebra, Giraffe, Hyena, Vulture

TEACHING STRATEGIES

Plants	Animals
Plants	Crayfish, Frogs, Snails, Hellgrammite (Dobsonfly Larva)
ree, Maple Tree, ees, Bushes, , Flowers	Pigeon, Man, Robin, Sparrow, Dog
s, Spanish Moss, ves, Lilies	Snake, Deer, Turtle
, Grass, Aspen, osses, Ferns s	Deer, Bear, Cougar, Bobcat, Wolf
, Sage Brush,	Jackrabbit, Prairie Dog, Fox, Coyote, Deer
, Yucca, ral, Sage Brush	Fox, Rattle Snake, Gerbil, Owl
, Trees, Shrubs, s	Lion, Zebra, Giraffe, Hyena, Vulture

ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE A

Activity 4-7: "Hunting In Other Areas"

Activity name suggested by class:

Teacher

BSCS USE: Post ___ Tally ___ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet # | # | #	Game #	Slides (show slide nos.)	Transparency # | # | #	Card(s) #	Tape(s) #	Other #
Worthwhile as is							
Revise slightly							
Revise much							
Worthless: omit							

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:

☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

---

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Were students able to accurately describe each environment and its inhabitants?
☐ Yes ☐ No: Comment.

18. What plants and animals did students suggest for each of the habitats listed?

Slide 4-5	Slide 4-6	Slide 4-7	Slide 4-8	Slide 4-9
everglades	mountain meadow	prairie	desert	African grassland

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE A
Activity 4-7: "Hunting In Other Areas"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    c. Realization that certain materials are in finite supply.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE A OBJECTIVES:

1. Reconstruct the transfer of energy through an environmental system.
2. Conclude that all materials are transferred through environmental systems.

MATERIALS

TEACHING STRATEGIES

Activity 4-8. Review Of Success

This review of success is divided into two parts. The first is structured, its completion should aid in the success of the second, which is relatively unstructured to allow latitude for the student's imagination. Use this activity only as an encouragement, not a discouragement, device!

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CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

a. Understanding of what a cycle is.

b. Understanding of the role of decomposers.

c. Realization that certain materials are in finite supply.

d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part of nature, not apart from nature.

BJECTIVES:

Reconstruct the transfer of energy through an environmental system.

Conclude that all materials are transferred through environmental systems.

TEACHING STRATEGIES

. Review Of Success

of success is divided into two parts. The
uctured, its completion should aid in the
he second, which is relatively unstructured
itude for the student's imagination. Use
y only as an encouragement, not a discourage-
!

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE A. ENERGY AND MATERIAL TRANSFER

ACTIVITY 4-8. REVIEW OF SUCCESS

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- *--answer each of the three instructional assessment questions.*
- *--cut out of magazines pictures of plants and animals that are related.*
- *--indicate with lines on his food web some interrelationships between the plants and animals.*
- *--explain to the class how materials and energy move through his food web.*
- *--explain to the class how one disaster in his food web might affect other organisms in the web.*

ACTIVITY 4-8

㊻

MATERIALS

Worksheet 4-3
*Many magazines
*Scissors
*Butcher paper
*Large felt pens
*Paste or tape
*35mm Slide projector

Worksheet 4-3

Slides 4-10 through 4-12

*Not furnished in materials kit

TEACHING STRATEGIES

CLUES TO

Part I.

Distribute Worksheet 4-3 and have each student put his name on it.

Project each question separately. Read the question and possible answers aloud to the students. Allow ample time for them to mark their worksheets.

After all students have had the opportunity to answer all of the questions, collect the worksheets. Then project each slide and discuss the answers with them. Have them defend their choices. After class, tally the students' answers on Tallysheet 4-3. Consider whether the whole class needs further review or if a few individuals need special attention.

Then proceed to the next part.

Part II.

Instruct students to cut pictures of plants and animals that they believe are part of a food web out of the magazines you provide. Have the students tape the

TEACHING STRATEGIES

CLUES TO SUCCESS

Worksheet 4-3 and have each student put his

question separately. Read the question and
swers aloud to the students. Allow ample
m to mark their worksheets.

tudents have had the opportunity to answer all
tions, collect the worksheets. Then project
nd discuss the answers with them. Have them
r choices. After class, tally the students'
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further review or if a few individuals need
ntion.

d to the next part.

dents to cut pictures of plants and animals
lieve are part of a food web out of the
u provide. Have the students tape the

ANTICIPATED STUDENT BEHAVIORS

Students:

--mark an X on the plant in answer to the question in Slide 4-10.

--place an X on "a food web" in answer to the question in Slide 4-11.

--should mark the appropriate choice after deciding that the number of fish in the pond will decrease and infer, therefore, that the birds depending upon them would no longer frequent the pond. (Slide 4-12.)

MATERIALS

Slide 4-10

Slide 4-11

Slide 4-12

TEACHING STRATEGIES

pictures onto a large piece of butcher paper. After they have placed the pictures on the paper, have them connect the plants and animals with lines to show the relationships that exist.

When the food webs are complete, ask each student to display his food web and explain the relationships he has drawn. Ask each student if he can explain how energy and materials are passed through the food web, and also if he can show how a disaster might affect his food web.

As each student explains his food web, capitalize on the good things that are in the food web and do not dwell on any errors made. You can use this activity as a gauge of your teaching success in Activities 4-1 through 4-7. If all of your students made a reasonable food web and have shown basically accurate interrelationships, you can consider it a job well done. Evaluate in your own mind the posters that do not meet this minimal standard. Perhaps you will need to backtrack to make certain concepts clearer. If students can explain material and energy flow and disasterous consequences in their food webs, you have put the frosting on the cake! You (and your students) deserve a cheer!

Display all the food webs somewhere in your room, if possible, and keep telling your students how great they are.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

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placed the pictures on the paper, have them
e plants and animals with lines to show the
ps that exist.

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s food web and explain the relationships he
Ask each student if he can explain how
materials are passed through the food web,
f he can show how a disaster might affect
b.

dent explains his food web, capitalize on the
that are in the food web and do not dwell
rs made. You can use this activity as a gauge
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nd keep telling your students how great they

Teacher ____________________
Date ____________________

UNIT IV, CYCLE A
TALLYSHEET 4-3

ACTIVITY 4-4: "[illegible]"

		1 (Plants)	2 (Food Web)	3 (Effect on Web)
Teacher	KEY	[✓ plants] man other	a [✓ b] c d	a b [✓ c] d
Attach ID list here	01	plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
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		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d
		plants man other	a b c d	a b c d

	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
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	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d
	plants	man	other	a	b	c	d	a	b	c	d

Does this review give an accurate indication of student understanding? ☐ Yes ☐ No
If not, what other evidence do you have of student learning?

UNIT IV, CORE A
Activity 4-8: "Review Of Success"

Activity name suggested by class:

Teacher
BSCS USE: Post ___ Tally ___ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	→ ______ ______ ______ ______
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	→ ______ ______ ______ ______

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No - Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No - Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

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14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did any student give away the answer to any question on this worksheet?
☐ No ☐ Yes: Comment.

18. Did any students have difficulty making their own food web?
☐ No ☐ Yes: Comment.

19. Did any students have difficulty explaining their web and what would happen in a disaster?
☐ No ☐ Yes: Comment.

20. Concern (or questions) about content:

21. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE A
Activity 4-8: "Review Of Success"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently
  or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or
  applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

UNIT IV
REACTIONS TO CORE A

1. Was the background information for this core adequate? ☐ Yes ☐ No
Comment:

2. Was it clear to you why these particular activities were chosen and the direction they were leading? ☐ Yes ☐ No
Comment:

3. Did the activities fulfill the purposes stated in the Guide for this core? ☐ Yes ☐ No
Comment:

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities? ☐ Yes ☐ No
6. If yes, what do you see as the "take-home" lesson? If no, what is needed?

7. In these materials, what things did your students find difficult to do?

8. Should there be more clues to success or reviews of success in this core? ☐ Yes ☐ No
Comment:

9. Was there too much reading and too many teacher directions? ☐ Yes ☐ No
Comment:

10. Did you make use of the Planning Guide? ☐ Yes ☐ No
Comment:

5. Is there a practical (take-home) value for your students in these activities? ☐ Yes ☐ No
6. If yes, what do you see as the "take-home" lesson? If no, what is needed?

7. In these materials, what things did your students find difficult to do?

8. Should there be more clues to success or reviews of success in this core? ☐ Yes ☐ No
Comment:

9. Was there too much reading and too many teacher directions? ☐ Yes ☐ No
Comment:

10. Did you make use of the Planning Guide? ☐ Yes ☐ No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

12. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain.

BSCS Evaluation: EMH Feedback Form 2a

SIDE A

NEW STUDENTS ENTERING DURING THIS CORE

Date Entered	Last Name Name Used	Ethnic Group	Sex	Birthdate	Test date	Test	Tota
		W B S O	M F			W B O	
		W B S O	M F			W B O	
		W B S O	M F			W B O	
		W B S O	M F			W B O	

W = white
B = black
S = Spanish-American
O = other

W = WISC
B = Binet
O = other (name)

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name First

ADDITIONAL INFORMATION ON NEW STUDENTS:

NEW STUDENTS ENTERING DURING THIS CORE

roup	Sex	Birthdate	Test date	Test	Total	Verbal	Performance	Previous Test Score
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				

e
k
ish-
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W = WISC
B = Binet
O = other
(name)

SIDE B

Me and my·
Environment

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRON

CORE B. DECOMPOSERS IN MY ENVIRONMENT

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

UNI

1. Appreciate the cycling relationshi
through:
   a. Understanding of what a cycle
   b. derstanding of the role of de
   c. Realization that certain materi
   d. Recognition of examples of man'
2. Comprehend the role of man as an i

OBJECTI

1. Know the habitat requirements of mi
2. Indicate how knowledge of decompose
3. Conclude that microbes contribute t
man.

IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

B. DECOMPOSERS IN MY ENVIRONMENT

BSCS

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UNIT IV GOALS

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.
   c. Realization that certain materials are in finite supply.
   d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES OF CORE B

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

Me and my Environment

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIR

CORE B. DECOMPOSERS IN MY ENVIRONMENT

CORE B RATIONALE

After developing the concept of a food web (Core A), the question may naturally arise: food web -- then what? In other words, what happens at the end of a food chain or set of relationships within the web. Obviously generation upon generation of plants and animals don't accumulate to any extent. All organisms die and eventually are decomposed. The materials are recycled through the ecosystem. An attempt has been made, not to account for the cycling of specific materials, but simply to develop an appreciation of the role of decomposers in the natural economy and to develop the concept of a cycle in general.

The accumulation of dead materials is reviewed with discussion of the class compost (Activity 6-10 and 6-17). A short activity (6-11) follows that suggests the role of macrodecomposers (e.g., earthworms, ants, snails, sow bugs, etc.) in the environment. At this point, the concept of habitat is strengthened through the consideration of the essential components of shelter, food and moisture. Attention is then later given to composted material and the role of microbes in decomposition. This activity (6-17) serves to recall both that microbes are small living organisms and that decomposition of the compost is due to these microbes.

The subject of habitat requirements is considered using the compost microbes. Two successive activities (6-12 and 6-13) demonstrate the effect of moisture and temperature on microbial growth. After some of the requirements for microbial growth have been established, one factor (temperature) is then carried to extreme (boiling). This suggests that variation of single environmental factors may limit microbial growth and in turn be used to advantage (food preservation). This concept is extended to the "real world" by a visit to a grocery store, where foods are examined, in Activity 6-15. The various methods of food packaging are examined in terms of conditions for microbial growth considered

BACK

Activity 6-9 inte
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maintenance of sow bug
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and water (moisture).
compost pile and Activ
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Activity 6-12 prov
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T IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

E B. DECOMPOSERS IN MY ENVIRONMENT

BSCS

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At this point, the
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s. Attention is then
microbes in decompo-
ts that microbes are
the compost is due to

ducted using the compost
13) demonstrates the
rowth. After some of
stablished, one factor
. This suggests that
t microbial growth and
This concept is
ery store, where foods
ods of food packaging
growth considered

BACKGROUND INFORMATION FOR THE TEACHER

Activity 4-9 introduces the concept of scavengers in the ecosystem. The term scavenger is usually applied to an animal that feeds upon dead or dying material that is usually discarded by other living things. In this role they function as decomposers, breaking down complex materials to simpler ones. Because these animals are obviously larger than microbes, they may be considered *macro* decomposers. Some animals that function as scavengers are: opossum, hyena, rat, vulture, gull, crow, earthworm, ant, snail, and sow bug. The latter are used in this activity because of their wide distribution and ease of handling in the classroom. Sow bugs (some that roll into a ball are known as pill bugs) are really small terrestrial crustaceans and not insects. An important function served by the maintenance of sow bugs in the classroom is to reinforce the essential components of a habitat: shelter (physical location), food (nutrients), and water (moisture). Activity 4-10 is simply the initiation of a class compost pile and Activity 4-11 is the making of the pillarium (sow bug habitat).

Activity 4-12 provides a link between the concept of habitat requirements and the function of microbes as decomposers. An assortment of organic materials (mostly foodstuffs of plant origin) are subjected to wet and dry conditions. The samples exposed to moist storage will usually develop very obvious microbial (fungus) growth. The success of this activity depends upon the careful choice of test materials: If beans, peas, or other seeds are used, be certain that they are intended for use as food and *not for gardening*. Seeds prepared for planting usually are treated to prevent fungus growth. If bread is used, be sure that it contains no *preservative* (now a common ingredient) to prevent mold. The bread should be stale to begin with since fresh bread may contain enough moisture to support mold even in a dry chamber. Be sure that selection of otherwise dry materials *excludes* salted and sugared products. Microbial growth in these materials will be inhibited by the high osmotic

CORE B RATIONALE (continued)

earlier. The core is concluded by directing attention again to the positive aspects of microbial activity. Microbes (yeast) are used to produce bread and wine in the classroom and the important role of decomposers in cycling things through the environment serves as a logical springboard to Core C.

BACKGROUND IN

presence of salt or suc
for livestock feed may
stone for this sample.
saturation of seeds on
with a greater likeliho
of a plant whose seeds
contain little or no
microbial growth in a

Activity B-13 is a
established earlier. Th
by a specific condition
aeration. This is a stra
precautions.

Activity B-14 will
condition related to
increased to boiling
deliberate use of
preservation.

Activity B-15 is a
should be placed on the
and should be directed
and preservation.

Activity B-16 uses
air they breathe (produ
that demonstrates that a
changes the air in a
that the decomposition
microbes. Students are
a process like they are

tion again to the
(yeast) are used
important role
nment serves as

BACKGROUND INFORMATION FOR THE TEACHER (continued)

presence of salt or sugar. In certain communities, the storage of hay for livestock feed may be of local importance. Be sure to use hay or straw for this sample. Hay is harvested in a green condition before maturation of seeds on the plant. Nutrients are therefore retained with a greater likelihood of mold. Straw is a term applied to the stalks of a plant whose seeds have been harvested for grain. These stalks contain little or no residual nutrients and are less likely to develop microbial growth in a short time.

Activity 8-13 is a variation of the habitat-requirement theme established earlier. The concept that microbial growth may be limited by a specific condition is expanded to another example, that of refrigeration. This is a straightforward experiment and requires no special precautions.

Activity 8-14 will develop the point that a given environmental condition carried to extreme may be lethal. In this case, temperature increased to boiling inhibits microbial growth. This will suggest the deliberate use of extreme conditions (heat, cold, dryness) in food preservation.

Activity 8-15 is a visit to a local grocery store. Emphasis here should be placed on the variety of packaging and storage methods employed and should be directed toward the students' "real" world of food storage and preservation.

Activity 8-16 uses a simple demonstration that humans change the air they breathe (produce carbon dioxide). An experiment then follows that demonstrates that a sample of class compost (containing microbes) changes the air in a similar way. The conclusion to be developed is that the decomposition occurring in the compost pile is due to living microbes. Students are led to believe that microbes are carrying on a process like they are and therefore microbes are probably alive.

BACKGROUN

The success of t
indicator solution t
indicator is a subst
substance by changin
changes to a green c
dioxide (CO_2) forms
this experiment becau
the presence of CO_2.

Activity B-17 di
microbes. Part I con
which man benefits d
In Part II, the use o
application of carbo

The last activit
decomposers in the cy

BACKGROUND INFORMATION FOR THE TEACHER (continued)

The success of this activity depends upon the use of a chemical indicator solution to detect carbon dioxide dissolved in water. An indicator is a substance that shows the presence of a chemical substance by changing color. Bromthymol blue is an indicator that changes to a green or yellow color in the presence of an acid. Carbon dioxide (CO_2) forms an acid when dissolved in water. Therefore in this experiment bromthymol blue can be used to indicate, indirectly, the presence of CO_2.

Activity 4-17 directs attention again to the positive role of microbes. Part I consists of a demonstration of fermentation in which man benefits directly from the products of microbial action. In Part II, the use of yeast in baking demonstrates the practical application of carbon dioxide production by microbes.

The last activity in this core, (4-20) should make the role of decomposers in the cycling of materials become more apparent.

Me and my·
Environment

UNIT IV
CORE B

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ☛ *in the*
be prepared several days or weeks in advance. Use this
a teaching and preparation schedule. All supplies need

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics an*
4-9. Starting The Run Around	35mm Slide projector	Flash cards:	
		Hawk	
		Frog	
		Mosquito	
Page _____		Man	
Date planned _____		Cow	
		Grass	
		Slide 4-13	Vulture On Car
		Slide 4-14	Beetle On Carc
		Slide 4-15	Ant Close Up C
		Slide 4-16	Ant Hill Activ
		Slide 4-17	Log
		Slide 4-18	Rotting Log - S
		Slide 4-19	Board
		Slide 4-20	Board Turned Ov
		Slide 4-21	Microscopic De
4-10. Decomposition In Class		Plastic shoe boxes with lids	Four per class
		Worksheet 4-4	Compost Pile Da
Page _____		Slide 4-22	Worksheet 4-4
Date planned _____	Bottle caps		*Any soft drink*
	Plastic bags		Four
	Pieces of plastic		*Approximately 2* *ammonia, etc.*
	Pieces of glass		*Approximately 2*
	Potting soil or peat moss		*Enough to fill* *at local gard*
	Organic matter		*Dried leaves, g*
	Large spoons to stir compost		Four
	35mm Slide projector		

PLANNING GUIDE

activities (*indicated in italics and an* ⬉ *in the margin*) must
repared several days or weeks in advance. Use this summary as
aching and preparation schedule. All supplies needed are listed.

BSCS

of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
	Materials in Supply Kit	
	Flash cards:	
	Hawk	
	Frog	
	Mosquito	
	Man	
	Cow	
	Grass	
	Slide 4-13	Vulture On Carcass
	Slide 4-14	Beetle On Carcass
	Slide 4-15	Ant Close Up Carrying Food
	Slide 4-16	Ant Hill Activity
	Slide 4-17	Log
	Slide 4-18	Rotting Log - Sow Bugs, Slugs, Etc.
	Slide 4-19	Board
	Slide 4-20	Board Turned Over - Sow Bugs, Slugs, Etc.
	Slide 4-21	Microscopic Decomposers
	Plastic shoe boxes with lids	Four per class
	Worksheet 4-4	Compost Pile Daily Records
	Slide 4-22	Worksheet 4-4
		Any soft drink bottle caps. Need at least four.
		Four
		Approximately 2" X 2" cut from plastic bottles such as bleach, ammonia, etc.
s		*Approximately 2" X 2" from any glass source.*
		Enough to fill the four shoe boxes two-thirds full. Purchase at local garden shop.
		Dried leaves, grass clippings, pieces of apple, banana, etc.
post		Four

Me and my Environment

UNIT IV
CORE B

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ➤ *in th* be prepared several days or weeks in advance. Use thi a teaching and preparation schedule. All supplies ne

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	*(Italics*
4-11. Pillarium	Rubber bands		One per stude
	Leaves		*Dried leaves*
	Potting soil		*Purchase at l* *Activity 4-* *one-half fu*
Page _____ Date planned _____			
	Toothpicks		One box
	Potatoes		Six
	Knife		One
➤			➤ *Consult the T* *making the* *the activit*
		Pill bugs	Fifty (approx
		Plastic tumblers	One per stude
		Sponge	Cut sponge in in each pil
4-12. Wet And Dry	Wax Crayons		One per stude
	Assorted dry foods		*Examples: co* *eg* *oa* *fl* *te* *ha* *be* *pe*
Page _____ Date planned _____			
	Dark storage place		
	35mm Slide projector		
		Plastic petri dishes with covers	Four per stud
		Filter paper discs (7 cm)	Four per stud
		Medicine droppers	One per stude

PLANNING GUIDE

ome activities (*indicated in italics and an* ➤ *in the margin*) must
e prepared several days or weeks in advance. Use this summary as
teaching and preparation schedule. All supplies needed are listed.

BSCS

ist of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
ish	Materials in Supply Kit	
		One per student
		Dried leaves
		Purchase at local garden shop. You may have enough from Activity 4-10. You need enough to fill 15 plastic tumblers one-half full.
		One box
		Six
		One
		➤ *Consult the Teacher Preparation section of Activity 4-11 for making the sow bug traps. They must be set two days before the activity begins.*
	Pill bugs	Fifty (approximately 2-3 per student)
	Plastic tumblers	One per student
	Sponge	Cut sponge into small pieces (1" X 1"). Place one small piece in each pillarium.
		One per student
		Examples: cornflakes *egg noodles* *oat flakes* *flour* *tea* *hay* *beans, dried for cooking* *peas, dried for cooking*
	Plastic petri dishes with covers	Four per student
	Filter paper discs (7 cm)	Four per student
	Medicine droppers	One per student

Me and my Environment

UNIT IV
CORE B

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ☛ *in the m*
be prepared several days or weeks in advance. Use this s
a teaching and preparation schedule. All supplies neede

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics and*
4-12. Wet And Dry (continued)		Slide 4-23	Worksheet 4-5
		Worksheet 4-5	Wet And Dry
	Art supplies for poster		*Secure art suppl experiment as*
4-13. Cool And Warm	Ice chest or refrigerator		One
	Baby food jars or milk cartons		*Two per student*
Page _____	Saran Wrap		One roll
Date planned _____	Food samples		*Provide food sam bring their sa*
	35mm Slide projector		
		Worksheet 4-6	Cool And Warm
		Slide 4-24	Worksheet 4-6
	Art supplies for poster		*Secure art suppl experiment as*
4-14. Hamburger Lab	Fresh ground beef		*Two teaspoons pe*
	Masking tape		One roll
	Water		Supply of
Page _____	35mm Slide projector		
Date planned _____	Warm storage place		
		Hot plate	One
		Teaspoon measure	One
		Cotton	Two pieces per s
		Test tubes, Pyrex (15 X 150 mm)	Two per student

PLANNING GUIDE

activities (*indicated in italics and an ⬋ in the margin*) must
prepared several days or weeks in advance. Use this summary as
aching and preparation schedule. All supplies needed are listed.

BSCS

of Supplies Needed		Notes and Suggestions to Teacher
n	Materials in Supply Kit	(*Italics and Arrow Indicate Advance Preparation Directions*)
	Slide 4-23	Worksheet 4-5
	Worksheet 4-5	Wet And Dry
		Secure art supplies to make large poster depicting this experiment as described in Activity 4-12.
or		One
		Two per student
		One roll
		Provide food samples for those students that forget to bring their sample.
	Worksheet 4-6	Cool And Warm
	Slide 4-24	Worksheet 4-6
		Secure art supplies to make large poster depicting this experiment as described in Activity 4-13.
		Two teaspoons per student
		One roll
		Supply of
	Hot plate	One
	Teaspoon measure	One
s	Cotton	Two pieces per student
	Test tubes, Pyrex (15 X 150 mm)	Two per student

Me and my Environment

UNIT IV
CORE B

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ➘ *in* be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italic*
4-14. Hamburger Lab (Continued)		Test tube holder Worksheet 4-7 1000 ml Beaker Test tube brush Slide 4-25	Four per c Hamburger One for bo One for cl Worksheet
4-15. Storing Problems Page _____ Date planned _____	Cassette tape recorder Blank tapes Question list Pencil and paper	Camera (Polaroid Square Shooter)	Optional Optional ➘ *You must c* *(at leas* *for deta*
4-16. Review Of Success Page _____ Date planned _____	Your weekly groceries 35mm Slide projector	Worksheet 4-8 Slide 4-26 Slide 4-27 Slide 4-28	*At least 3* Review Of Question 1 Question 2 Question 3

PLANNING GUIDE

ome activities (*indicated in italics and an ➘ in the margin*) must
e prepared several days or weeks in advance. Use this summary as
teaching and preparation schedule. All supplies needed are listed.

BSCS

ist of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
ish	Materials in Supply Kit	
	Test tube holder	Four per class
	Worksheet 4-7	Hamburger Lab
	1000 ml Beaker	One for boiling water
	Test tube brush	One for cleaning test tubes
	Slide 4-25	Worksheet 4-7
er		Optional
		Optional
	Camera (Polaroid Square Shooter)	
		➘ *You must contact your local store manager well in advance (at least one week) before this activity. See activity for details.*
		At least 30 items of great variety
	Worksheet 4-8	Review Of Success
	Slide 4-26	Question 1 Review Of Success
	Slide 4-27	Question 2 Review Of Success
	Slide 4-28	Question 3 Review Of Success

Me and my Environment

UNIT IV
CORE B

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ☛ *in the* be prepared several days or weeks in advance. Use this a teaching and preparation schedule. All supplies need

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics an*
4-17. Compost Microbes	Compost		From Activity
	Soda straws		*One per studen*
	Wax crayon		One per pair o
Page _____		Worksheet 4-4	Filled in with
Date planned _____		250 ml Flasks	One per pair o
		Rubber stoppers	One-hole, #8,
		Tygon tubing	12" pieces, on
		Test tubes (15 X 150 mm)	One per studen
		Carbon dioxide test solution (bromthymol blue)	Ten drops per
	Water		Supply of
		Rubber stoppers	No-hole, #1, o
4-18. A Real Gas	Dried yeast		*Two packages*
	Large bowls		*Two*
	Frozen grape juice		*One can (noncon prevent ferm*
Page _____			
Date planned _____	Table sugar		*Several tables*
	Tablespoon		*One*
	Teaspoon		*One*
	Bread pans		*Two*
	Clean cloths		*Two*
	Flour sifter		*One*
	Butter		*1/4 lb.*
	Flour (sifted all purpose)		*Two pounds*
		250 ml Flask	One
		Rubber stopper (one-hole, #8)	One
		Tygon tubing	One piece 12"

PLANNING GUIDE

e activities (*indicated in italics and an* ◀ *in the margin*) must
prepared several days or weeks in advance. Use this summary as
eaching and preparation schedule. All supplies needed are listed.

BSCS

of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
h	Materials in Supply Kit	
		From Activity 4-10
		One per student
		One per pair of students
	Worksheet 4-4	Filled in with student observations
	250 ml Flasks	One per pair of students
	Rubber stoppers	One-hole, #8, one per pair of students
	Tygon tubing	12" pieces, one per pair of students
	Test tubes (15 X 150 mm)	One per student
	Carbon dioxide test solution (bromthymol blue)	Ten drops per student
		Supply of
	Rubber stoppers	No-hole, #1, one per student
		Two packages
		Two
		One can (nonconcentrated juice has preservatives added to prevent fermentation)
		Several tablespoons full
		One
		One
		Two
		Two
		One
		1/4 lb.
se)		*Two pounds*
	250 ml Flask	One
	Rubber stopper (one-hole, #8)	One
	Tygon tubing	One piece 12" long

Me and my Environment

UNIT IV
CORE B

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ☛ *in th*
be prepared several days or weeks in advance. Use thi
a teaching and preparation schedule. All supplies ne

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics*
4-18. A Real Gas (Continued)	 Oven	400 ml Beakers Test tube Measuring cup	Two One One At home or sc
4-19. Completing The Run Around Page _____ Date planned _____	 Butcher paper Magazines Tape or glue Felt pens	Flash cards Booklet	One deck per *The Long Jour* *Large piece,* *Many with pic* Enough for al Four per clas
4-20. Review Of Success Page _____ Date planned _____	35mm Slide projector	Worksheet 4-9 Slide 4-29 Slide 4-30 Slide 4-31	Review Of Suc Question 1 Re Question 2 Re Questions 3 a

PLANNING GUIDE

Some activities (*indicated in italics and an* ➡ *in the margin*) must be prepared several days or weeks in advance. Use this summary as a teaching and preparation schedule. All supplies needed are listed.

BSCS

List of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
nish	Materials in Supply Kit	
	400 ml Beakers	Two
	Test tube	One
	Measuring cup	One
		At home or school to bake bread
	Flash cards	One deck per class
	Booklet	*The Long Journey*, one per student
		Large piece, one per student
		Many with pictures
		Enough for all students to use generously
		Four per class
	Worksheet 4-9	Review Of Success
	Slide 4-29	Question 1 Review Of Success
	Slide 4-30	Question 2 Review Of Success
	Slide 4-31	Questions 3 and 4 Review Of Success

Me and my Environment

MATERIALS

Flash cards: Hawk
Frog
Mosquito
Man
Cow
Grass
*35mm Slide projector
Slides 4-13 through 4-21

*Not furnished in materials kit

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.

CORE B OBJECTIVES:

2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

TEACHING STRATEGIES

Activity 4-9. Starting The Run Around

This activity should be used only as an introduction to the concepts of Core B. It is not intended that the aspects of the environment hinted at in the slides be pursued in any depth. Simply elicit preliminary discussion and pose the unifying questions.

NOTE: Materials required for Activity 4-10 must be secured now.

Place the six flash cards in the chalk tray in front of the class so all students can see them.

Begin by asking:

WHO CAN ARRANGE THESE FLASH CARDS IN AN ORDER THAT SHOWS A FOOD CHAIN?

UN

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--

--

St

--

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

a. Understanding of what a cycle is.

b. Understanding of the role of decomposers.

OBJECTIVES:

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-9. STARTING THE RUN AROUND

BSCS

TEACHING STRATEGIES

. Starting The Run Around

y should be used only as an introduction to of Core B. It is not intended that the he environment hinted at in the slides be ny depth. Simply elicit preliminary discus- e the unifying questions.

ials required for Activity 4-10 must be ed now.

x flash cards in the chalk tray in front of all students can see them.

ing:

ARRANGE THESE FLASH CARDS IN AN HAT SHOWS A FOOD CHAIN?

ANTICIPATED STUDENT BEHAVIORS

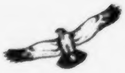
At the end of this activity, each student should:

- *--have viewed an introductory slide sequence on decomposers.*
- *--have participated in a preliminary discussion of decomposition.*
- *--contemplate the question, "Why aren't we being buried in dead things?"*

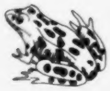
Students:

--should recall their food chain work in earlier activities and place the cards in a logical food chain.

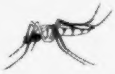
MATERIALS



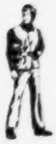
Hawk



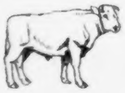
Frog



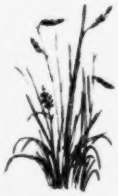
Mosquito



Man



Steer



Grasses

TEACHING STRATEGIES

Have a volunteer arrange the flash cards in a logical order and explain his arrangement as he does so. When a reasonable food chain has been formed, write the names above the cards and connect them with arrows as you did in Core A of Unit IV.

HAWK→FROG→MOSQUITO→MAN→COW→GRASS

The focus of the next question sequence is on the two ends of the food chain. Start with the end the students can recall from Unit III by asking:

WHAT DOES GRASS EAT? WHAT DO PLANTS EAT?

If students do not know this let them speculate and discuss what they think plants eat. It really doesn't matter that they have the answer at this point. The contemplation practice is much more meaningful to the students than the answer.

After students have had time to discuss what plants eat, focus their attention on the other end of the food chain by asking:

WHAT EATS HAWKS?

The intent of this question is to draw attention to the fact that in forming food chains it looks like there is an end of the line. Of course, there is no end of the line but students have probably never thought about the continuation of the story. Therefore, the intent of this question is not to get an answer but rather to pose a question that students would probably not ask themselves. Continue to promote thinking by asking:

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
unteer arrange the flash cards in a logical order n his arrangement as he does so. When a reason- chain has been formed, write the names above the connect them with arrows as you did in Core A of	Students:
→ FROG → MOSQUITO → MAN → COW → GRASS	
of the next question sequence is on the two ends d chain. Start with the end the students can m Unit III by asking:	
DOES GRASS EAT? WHAT DO PLANTS EAT?	--should recall their work with plants and respond, "They make their own food," "The sun," "They don't eat."
s do not know this let them speculate and discuss think plants eat. It really doesn't matter that the answer at this point. The contemplation s much more meaningful to the students than the	
ents have had time to discuss what plants eat, r attention on the other end of the food chain by	
EATS HAWKS?	--will probably be perplexed and say, "I don't know."
of this question is to draw attention to the in forming food chains it looks like there is the line. Of course, there is no end of the tudents have probably never thought about the on of the story. Therefore, the intent of this s not to get an answer but rather to pose a hat students would probably not ask themselves. o promote thinking by asking:	

MATERIALS

TEACHING STRATEGIES

DOES SOMETHING HAVE TO EAT A HAWK? OR DOES THERE HAVE TO BE SOMETHING IN THE WORLD THAT EATS HAWKS?

Then ask:

DO HAWKS LIVE VERY LONG? FOREVER?

WHAT HAPPENS TO DEAD HAWKS?

WHAT HAPPENS TO ANY ANIMAL WHEN IT DIES?

ARE THERE A LOT OF ANIMALS IN THE WORLD?

ARE A LOT OF THEM DYING EVERY DAY?

Ask the next three questions, anticipating a variety of student responses and answers that need not be corrected or modified at this point. They are meant only to be introductory in nature.

WHY DON'T WE SEE A LOT OF DEAD ANIMALS?

WHAT HAPPENS TO THEM?

WHY AREN'T THEY PILING UP OUTSIDE?

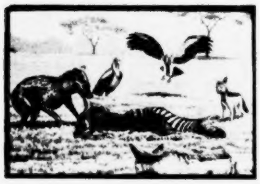
LET'S LOOK AT SOME SLIDES THAT MIGHT GIVE US SOME CLUES.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ETHING HAVE TO EAT A HAWK? OR DOES AVE TO BE SOMETHING IN THE WORLD THAT KS?	--will probably think there is something that eats hawks, but probably will not know what.
LIVE VERY LONG? FOREVER?	--will probably not know how long hawks live, but will undoubtedly decide that they do not live forever.
PENS TO DEAD HAWKS?	--respond, "Stop flying," "Fall to the ground," "Rot."
PENS TO ANY ANIMAL WHEN IT DIES?	--should relate their experiences with dead animals and say such things as, "Rot," "Turn color," "Get buried," etc.
E A LOT OF ANIMALS IN THE WORLD?	--respond, "Yes."
T OF THEM DYING EVERY DAY?	--respond, "Yes."
three questions, anticipating a variety of nses and answers that need not be corrected t this point. They are meant only to be in nature.	
T WE SEE A LOT OF DEAD ANIMALS?	--respond, "They don't live here," "We don't look for them."
ENS TO THEM?	--respond, "I don't know."
T THEY PILING UP OUTSIDE?	--respond, "I don't know."
K AT SOME SLIDES THAT MIGHT GIVE US S.	

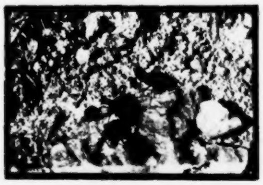
ACTIVITY 4-9

MATERIALS

Slide 4-13



Slide 4-14



TEACHING STRATEGIES

Project Slide 4-13 and say:

> DESCRIBE WHAT YOU SEE.

Then ask:

> WHAT DO YOU NOW KNOW HAPPENS TO SOME DEAD ANIMALS?
>
> DOES ANYONE KNOW WHAT WE CALL THINGS THAT EAT OTHER DEAD THINGS?

Introduce the word scavenger to your students at this point as the word scientists use to describe animals that eat and gather things that are usually discarded by most other animals. Scavengers could literally (*Webster's New World Dictionary*) be described as the "junkmen" of the natural world. Core C of this unit will cope with other aspects of the "junk" and "junkmen" of the world.

After developing an initial understanding of the word scavenger and having discussed the scene in Slide 4-13 for as long as students desired, project Slide 4-14 and ask:

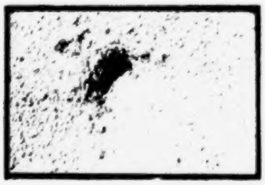
> DESCRIBE WHAT YOU SEE IN THIS SCENE?
>
> WHAT IS THE SCAVENGER IN THIS PICTURE?
>
> WHAT DOES A SCAVENGER DO?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ide 4-13 and say:	
RIBE WHAT YOU SEE.	--should describe the scene in their own words, pointing out the dead animal and the ugly bird eating the dead animal.
DO YOU NOW KNOW HAPPENS TO SOME DEAD LS?	--respond, "They get eaten by other animals."
ANYONE KNOW WHAT WE CALL THINGS THAT THER DEAD THINGS?	--respond, "Cannibals," "I don't know."
the word scavenger to your students at this point d scientists use to describe animals that eat and ngs that are usually discarded by most other Scavengers could literally (*Webster's New ionary*) be described as the "junkmen" of the rld. Core C of this unit will cope with other the "junk" and "junkmen" of the world.	
loping an initial understanding of the word and having discussed the scene in Slide 4-13 for students desired, project Slide 4-14 and ask:	
IBE WHAT YOU SEE IN THIS SCENE?	--respond, "A bug," "A beetle," "A scavenger eating on a dead body."
IS THE SCAVENGER IN THIS PICTURE?	--respond, "The bug," "The beetle."
DOES A SCAVENGER DO?	--respond, "Eats things that others usually do not."

MATERIALS

Slide 4-15

Slide 4-16



Slide 4-17

TEACHING STRATEGIES

Now project Slide 4-15 and ask:

WHAT ANIMAL DO YOU SEE IN THIS PICTURE?

WHAT IS IT DOING?

WOULD YOU CALL HIM A SCAVENGER?

WHY?

Then project Slide 4-16 and ask:

WHAT DO WE SEE IN THIS PICTURE?

CAN AN ANT EAT A LOT OF DEAD THINGS?

WHY NOT?

CAN A WHOLE HILL OF ANTS EAT A LOT?

WHY?

HOW MANY ANTS ARE THERE IN (your city)?

Project Slide 4-17 and ask:

WHAT DO YOU SEE HERE?

DOES ANYTHING EAT LOGS?

Project Slide 4-18 and ask:

WHAT IS HAPPENING TO THE LOG?

WHAT IS CAUSING THE LOG TO CHANGE?

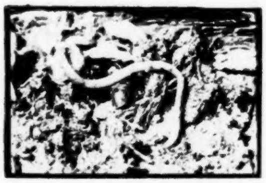
DO MOST ANIMALS EAT LOGS?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
Slide 4-15 and ask:	
NIMAL DO YOU SEE IN THIS PICTURE?	--respond, "An ant."
S IT DOING?	--respond, "Carrying a big piece of food."
YOU CALL HIM A SCAVENGER?	--respond, "Yes."
	--should give a working definition of a scavenger and relate how an ant fits the definition.
t Slide 4-16 and ask:	
WE SEE IN THIS PICTURE?	--respond, "An ant hill."
ANT EAT A LOT OF DEAD THINGS?	--respond, "No."
T?	--respond, "It is too small."
WHOLE HILL OF ANTS EAT A LOT?	--probably respond, "Yes."
	--respond, "There are so many of them."
NY ANTS ARE THERE IN (your city)?	--respond, "Wow, a bunch!"
de 4-17 and ask:	
YOU SEE HERE?	--respond, "A log."
NYTHING EAT LOGS?	--probably will predict, "No."
de 4-18 and ask:	
S HAPPENING TO THE LOG?	--respond, "It looks funny," "Rotten," "It's disappearing."
S CAUSING THE LOG TO CHANGE?	--should infer, "Probably the worms and bugs."
ANIMALS EAT LOGS?	--respond, "No."

ACTIVITY 4-9

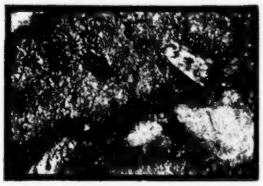
MATERIALS

Slide 4-18



Slide 4-19

Slide 4-20



TEACHING STRATEGIES

WHAT WOULD YOU CALL THESE "WORMS AND BUGS" THAT DO?

At this point introduce the word "decompose" to your students. Explain that compose means to put together and that decompose means to break apart. Point out that as the "worms and bugs" eat the log, they break it apart and we thus say it has been decomposed. Explain that in addition to calling some organisms scavengers, we might also describe some as decomposers.

After introducing the word, project Slide 4-19 and ask:

WHAT DO YOU SEE HERE?

IS IT BEING DECOMPOSED?

Project Slide 4-20 and say:

HOW DOES THIS SLIDE LOOK COMPARED TO THE LAST ONE?

IS IT BEING DECOMPOSED?

WHAT DOES DECOMPOSE MEAN?

DO YOU SEE ANY SCAVENGERS?

Now project Slide 4-21 and say:

DESCRIBE WHAT YOU SEE IN THIS PICTURE.

Point to the scene showing what is being viewed under the microscope and ask:

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
WOULD YOU CALL THESE "WORMS AND BUGS" DO?	--respond, "Scavengers."
nt introduce the word "decompose" to your Explain that compose means to put together ecompose means to break apart. Point out that rms and bugs" eat the log, they break it apart say it has been decomposed. Explain that to calling some organisms scavengers, we describe some as decomposers.	
ducing the word, project Slide 4-19 and ask:	
DO YOU SEE HERE?	--respond, "A board."
BEING DECOMPOSED?	--respond, "No," "Doesn't look like it."
de 4-20 and say:	
ES THIS SLIDE LOOK COMPARED TO THE NE?	--observe and respond, "It's the bottom of the board," "It is rotten."
BEING DECOMPOSED?	--respond, "Yes."
OES DECOMPOSE MEAN?	--should give a reasonable definition in their own words.
SEE ANY SCAVENGERS?	--respond, "Yes," "The bugs," etc.
Slide 4-21 and say:	
BE WHAT YOU SEE IN THIS PICTURE.	--should observe the slide and describe the scene, identifying the person, the microscope, and that something is being seen through the microscope.
e scene showing what is being viewed under the and ask:	

MATERIALS

Slide 4-21

TEACHING STRATEGIES

WHAT DO YOU SUPPOSE THESE THINGS ARE?

Then say:

EARLIER WE STUDIED SOME VERY SMALL THINGS THAT WE COULD NOT SEE. WHAT DID WE CALL THEM?

Then say:

MANY MICROBES BREAK THINGS APART BY EATING THEM. MICROBES THAT DO THIS ARE DECOMPOSERS.

CAN WE SEE ALL DECOMPOSERS?

Then say:

SOME DECOMPOSERS ARE LARGE AND SOME ARE SO SMALL WE CANNOT SEE THEM WITHOUT A MICROSCOPE. WE WILL BE STUDYING SOME OF THESE IN OUR NEXT ACTIVITIES.

Returning to the original questioning conclude by asking:

WHY AREN'T DEAD ANIMALS PILING UP ALL AROUND US?

WHO MIGHT EAT A DEAD HAWK?

Do not worry about an absolute answer here since it will be asked again at the end of this core.

NOTE: Please read the teacher preparation section of Activity 4-11 now!

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
DO YOU SUPPOSE THESE THINGS ARE?	--should speculate as to the nature of the microorganisms. They might guess scavengers or decomposers.
IER WE STUDIED SOME VERY SMALL THINGS THAT OULD NOT SEE. WHAT DID WE CALL THEM?	--should recall, "Microbes."
MICROBES BREAK THINGS APART BY EATING . MICROBES THAT DO THIS ARE DECOMPOSERS.	
WE SEE ALL DECOMPOSERS?	--infer, "No, some are too small."
DECOMPOSERS ARE LARGE AND SOME ARE SO L WE CANNOT SEE THEM WITHOUT A MICROSCOPE. ILL BE STUDYING SOME OF THESE IN OUR NEXT VITIES.	
to the original questioning conclude by asking:	
AREN'T DEAD ANIMALS PILING UP ALL AROUND US?	--respond, "Things are eating them," "They are being decomposed."
MIGHT EAT A DEAD HAWK?	--respond, "Bugs," "Worms," "Ants," "Microbes."
rry about an absolute answer here since it will again at the end of this core.	
ease read the teacher preparation section of tivity 4-11 now!	

UNIT IV, CORE B
ACTIVITY 4-9: "Starting The Run Around"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ____

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: (Number)   Name students you noted especially:

	(Number)	Name students you noted especially:
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did students have difficulty arranging a reasonable food chain?
☐ No ☐ Yes: Comment.

18. Did students have problems recognizing or describing any slide?
☐ No ☐ Yes: If yes, which? Explain.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-9: "Starting The Run Around"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

- ☐ how you organized materials or class.
- ☐ things added (a question, a picture, etc.).
- ☐ equipment, supplies, visual aids.
- ☐ things that went wrong, misunderstandings.
- ☐ what you would do differently or avoid next time.

THE STUDENTS

- ☐ who had problems and what they were.
- ☐ how someone "caught on" (or who never did).
- ☐ who was really "turned off" (or on).
- ☐ reactions of parents, teachers, students.
- ☐ special evidence of learning or applying ideas.

- ☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - a. Understanding of what a cycle is.
    - b. Understanding of the role of decomposers.
    - d. Recognition of examples of man's impact upon the environment.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.

MATERIALS

TEACHING STRATEGIES

Activity 4-10. Decomposition In Class

This activity will be a long-range activity and a group project rather than an individual one. Students should build on their background of understanding about decomposition and develop some practical experience with composting. These ideas should relate to man's ability to use his knowledge of decomposition to improve his environment and to the student's ability to improve his own environment through a knowledge of decomposition.

FOCUS FOR THIS ACTIVITY

GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.
   d. Recognition of examples of man's impact upon the environment.

 OBJECTIVES:

. Know the habitat requirements of microbes and other decomposers.

. Indicate how knowledge of decomposers can improve man's environment.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-10. DECOMPOSITION IN CLASS

BSCS

TEACHING STRATEGIES

10. Decomposition In Class

ty will be a long-range activity and a group
her than an individual one. Students should
eir background of understanding about decom-
d develop some practical experience with
These ideas should relate to man's ability
knowledge of decomposition to improve his
and to the student's ability to improve
ironment through a knowledge of decomposition.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- *--be able to define compost as "a mixture of decaying materials."*
- *--be able to relate the idea of composting to fertilizers and gardening.*
- *--associate decomposition of dead material with the soil-building process.*
- *--be prepared to develop a concept of biodegradable and nonbiodegradable materials in Core C.*

ACTIVITY 4-10

MATERIALS

- 4 Plastic shoe boxes with lids
- *4 Bottle caps
- *4 Plastic bags
- *4 Pieces of plastic approximately (2" X 2")
- *4 Pieces of glass approximately (2" X 2")
- *Other items of students' choice
- *Potting soil or peat moss
- *Organic matter such as:
  - Leaves
  - Grass clippings
  - Pieces of apple, banana, etc.
- Worksheet 4-4
- Slide 4-22
- *35mm Slide projector
- *4 Large spoons

*Not furnished in materials kit

TEACHING STRATEGIES

This activity involves setting up compost piles, watching them for several weeks, recording changes in the compost, and then relating these changes to microbe activity and decomposition. Ultimately this will allow the student to complete the cycle of materials relationships in the environment. The important aspects of this activity will come out in Activity 4-17. This activity will involve setting up the compost piles and giving the students clues for their observations.

Begin by asking:

> WHERE WOULD YOU PUT SOMETHING IF YOU WANTED IT TO DECOMPOSE QUICKLY?

Then say:

> THINGS CAN BE DECOMPOSED IN SOIL. WHY DO YOU SUPPOSE THIS MIGHT BE A GOOD PLACE TO DECOMPOSE THINGS?

Now introduce the term "compost pile." Explain that it is the procedure outlined below that people use to create natural fertilizer by decomposition

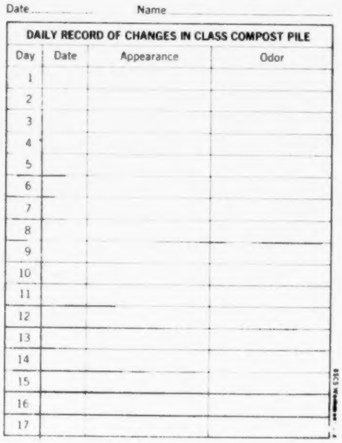
Now give each student Worksheet 4-4. Project Slide 4-22 and explain the worksheet to your students. Help students each day to verbalize and write observations of their compost piles. Have students date their worksheet appropriately each day and write something in the record column. Take about five minutes at the beginning of your class period for the next two weeks to stir up the compost and allow students to observe it. The things students will

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ty involves setting up compost piles, watching veral weeks, recording changes in the compost, elating these changes to microbe activity and on. Ultimately this will allow the student to e cycle of materials relationships in the . The important aspects of this activity will Activity 4-17. This activity will involve the compost piles and giving the students clues bservations.	
king:	
WOULD YOU PUT SOMETHING IF YOU WANTED DECOMPOSE QUICKLY?	--respond by guessing, "Where the bugs are," "In the ground," "In a lake," "I don't know."
CAN BE DECOMPOSED IN SOIL. WHY DO YOU E THIS MIGHT BE A GOOD PLACE TO DECOMPOSE S?	--should speculate on soil and give possible explanations such as, "Worms live there," "It's dirty," etc.
ce the term "compost pile." Explain that it is re outlined below that people use to create rtilizer by decomposition	
ch student Worksheet 4-4. Project Slide 4-22 the worksheet to your students. Help students verbalize and write observations of their es. Have students date their worksheet appro- ch day and write something in the record column. five minutes at the beginning of your class the next two weeks to stir up the compost and nts to observe it. The things students will	

MATERIALS

Slide 4-22

Worksheet 4-4



Date ________ Name ________

DAILY RECORD OF CHANGES IN CLASS COMPOST PILE

Day	Date	Appearance	Odor
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

TEACHING STRATEGIES

observe will be the changes in color, texture, size, and odor of all the things you put in the pile. Help students daily but do not tell them what is happening.

Now proceed to set up the class compost piles. Divide the class into four teams. Set the compost piles up slowly, explaining what to do at each step. Have students record on their worksheets what each thing is like that they put into the pile.

As each item is put in the box help focus attention by asking questions such as:

> WHAT COLOR IS (item)?
>
> HOW DOES THE (item) FEEL?
>
> HOW DOES THE (item) SMELL?

The compost piles should be set up as shown in Diagram 4-3. Place about 1/2 inch of potting soil on the bottom of the shoe boxes. Then put a layer of organic matter on top of the soil. Then place another layer of soil in the boxes on top of the organic material. Continue this pattern until the boxes are about 2/3 full. In the various layers of organic matter, have students place the bottle cap, plastic bag, piece of plastic, piece of glass, and other items of their choice that they can bring the next day.

When all the contents are in the boxes, add enough water to the boxes to make all the contents damp. Continue to add moisture to the boxes as needed periodically. After the contents are in the boxes, place a lid on each box and store them in a dark, warm place in your room.

Each day for the next two weeks the boxes should be brought out and examined. The contents of the boxes should be stirred and mixed each day. Obviously the compost is going

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ll be the changes in color, texture, size, and l the things you put in the pile. Help students do not tell them what is happening.	
d to set up the class compost piles. Divide the four teams. Set the compost piles up slowly, what to do at each step. Have students record orksheets what each thing is like that they he pile.	
em is put in the box help focus attention by stions such as:	
COLOR IS (item)?	--respond appropriately.
ES THE (item) FEEL?	--respond appropriately.
ES THE (item) SMELL?	--respond appropriately.
piles should be set up as shown in Diagram about 1/2 inch of potting soil on the bottom boxes. Then put a layer of organic matter on soil. Then place another layer of soil in the p of the organic material. Continue this il the boxes are about 2/3 full. In the various organic matter, have students place the bottle c bag, piece of plastic, piece of glass, and of their choice that they can bring the next	
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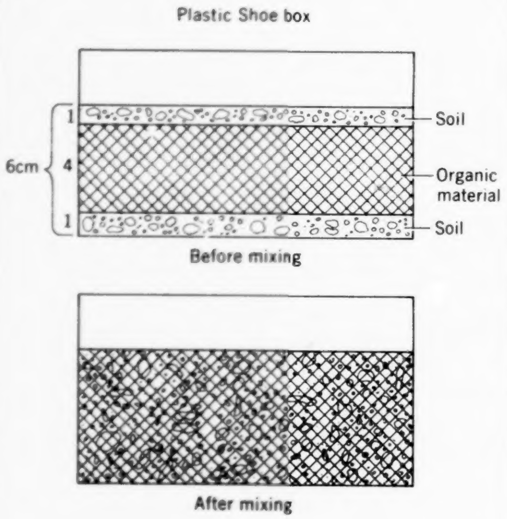
MATERIALS

Diagram 4-3



TEACHING STRATEGIES

to get smelly! Students will get the odor effect as you take the lid off each day. They will not have to put their noses down into the compost to get the smell effect. You can store the boxes another place if they are too offensive for your room. If you live in a warm area they can be stored and/or opened out of doors. Use your discretion here.

Certain components in the compost piles will change drastically in the two-week period and others will change very little. These changes will be noted and discussed further by students in Activities 4-22 and 4-26. So for the next two weeks, work with your students' ability to observe, remember, compare, and record their findings.

To terminate this "set up" day, ask students to make some guesses as to what is going to happen by asking:

> DO YOU SUPPOSE THIS PILE OF STUFF IS GOING TO CHANGE? HOW?
>
> WHAT DO YOU THINK WILL HAPPEN TO THE (item)?

Repeat this question for all the objects you have placed in the compost pile.

ACCEPT A
ANSWER

WAITING TI

TEACHING STRATEGIES

ly! Students will get the odor effect as you d off each day. They will not have to put down into the compost to get the smell effect. re the boxes another place if they are too or your room. If you live in a warm area they ed and/or opened out of doors. Use your here.

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SUPPOSE THIS PILE OF STUFF IS GOING NGE? HOW?

O YOU THINK WILL HAPPEN TO THE (item)?

question for all the objects you have he compost pile.

ANTICIPATED STUDENT BEHAVIORS

Students:

--should make their guesses.

--should make their guesses.

--should make guesses for all the objects in the compost pile.

ACCEPT ALL ANSWERS

WAITING TIME

MATERIALS

TEACHING STRATEGIES

Each succeeding day give students much help with observations and records. Continue to focus their attention each day with questions such as:

> DOES THE (item) LOOK THE SAME TODAY AS IT DID YESTERDAY?
>
> HOW IS IT DIFFERENT?
>
> WHY IS IT NOT DIFFERENT?
>
> WHAT COLOR IS (item) TODAY?
>
> HAS THE COLOR OF (item) CHANGED SINCE YESTERDAY?
>
> DOES THE (item) FEEL THE SAME AS YESTERDAY?
>
> DOES THE (item) SMELL THE SAME AS YESTERDAY?
>
> WHAT IS HAPPENING IN OUR COMPOST PILE?

A strategy for terminating the compost pile is given in Activity 4-16.

For the next several weeks you will need to allow time each day for students to observe and record changes in the compost pile. Activity 4-11 introduces a second subject, the pillarium, to be observed daily for one week. The experiments in Activities 4-12, 4-13, and 4-14 also require short periods of daily observation. Use Tallysheet 4-4 to record the length of time and any amount of confusion that may occur in performing these multiple observations.

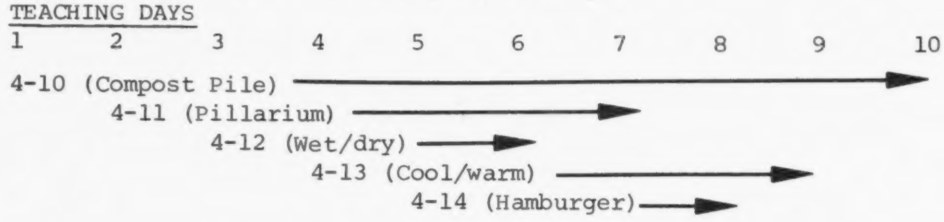
TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ding day give students much help with observa- ecords. Continue to focus their attention each estions such as:	
HE (item) LOOK THE SAME TODAY AS IT DID DAY?	--respond appropriately.
IT DIFFERENT?	--should identify appropriate changes.
IT NOT DIFFERENT?	--should realize some of the properties of the items and conclude that they are not going to decompose.
LOR IS (item) TODAY?	--respond appropriately.
COLOR OF (item) CHANGED SINCE YESTERDAY?	--should consult their records, compare, respond appropriately.
HE (item) FEEL THE SAME AS YESTERDAY?	--respond appropriately.
HE (item) SMELL THE SAME AS YESTERDAY?	--respond appropriately.
HAPPENING IN OUR COMPOST PILE?	--should look at their records and conclude that some things are decomposing and some are not.
or terminating the compost pile is given in 6.	
several weeks you will need to allow time students to observe and record changes in the . Activity 4-11 introduces a second subject, m, to be observed daily for one week. The in Activities 4-12, 4-13, and 4-14 also t periods of daily observation. Use Tallysheet d the length of time and any amount of confu- y occur in performing these multiple .	

Teacher ______________________
Date ______________________

UNIT IV, CORE B
TALLYSHEET 4-4
Activities 4-10 through 4-14

Two difficulties may arise in the next sequence of activities (4-10 through 4-14). Students will be expected to observe and record multiple experiments on a daily basis. In order to (1) determine the length of time spent daily on observing and recording and (2) determine if students were confused shifting from one experiment to another, please keep a daily record of these two factors on this tallysheet. Categories for recording are explained below.

Time: Record the approximate time (in minutes) each day that students take to observe and record all continuing experiments. The daily observations (Activities 4-10 through 4-14) overlap as shown below so by the fifth teaching day after Activity 4-10 students may be observing five things.



Rating of Confusion: You are asked to make two ratings - first consider the whole group and check one of the following categories each day; second, if there are a few students who are lost even though the group as a whole has little or no problem, list those students.

No confusion	The group was able to observe and record without confusion in shifting from one experiment to another.
Little confusion	The group was able to observe and record multiple experiments with teacher guidance, confusion in shifting was relieved.
Moderate confusion	The group was able to observe and record multiple experiments with continued help and clarification from the teacher.
Much confusion	The group was unable to keep track of multiple experiments; recording was done on the wrong sheets; students experienced a very high level of frustration; were still confused after teacher guidance.

Write in the date of your tally and amount of time students spent observing and recording. Circle the activities which were being observed and recorded on that date. Circle the amount of confusion expressed on that date.

DATE:										

4-13 (Cool/warm) →
4-14 (Hamburger) →

Rating of Confusion: You are asked to make two ratings - first consider the whole group and check one of the following categories each day; second, if there are a few students who are lost even though the group as a whole has little or no problem, list those students.

No confusion	The group was able to observe and record without confusion in shifting from one experiment to another.
Little confusion	The group was able to observe and record multiple experiments with teacher guidance, confusion in shifting was relieved.
Moderate confusion	The group was able to observe and record multiple experiments with continued help and clarification from the teacher.
Much confusion	The group was unable to keep track of multiple experiments; recording was done on the wrong sheets; students experienced a very high level of frustration; were still confused after teacher guidance.

Write in the date of your tally and amount of time students spent observing and recording. Circle the activities which were being observed and recorded on that date. Circle the amount of confusion expressed on that date.

	DATE:										
	TIME SPENT:										
Compost Pile:	Act.	4-10	4-10	4-10	4-10	4-10	4-10	4-10	4-10	4-10	4-10
Pillarium:	Act.	4-11	4-11	4-11	4-11	4-11	4-11	4-11	4-11	4-11	4-11
Wet/dry foods:	Act.	4-12	4-12	4-12	4-12	4-12	4-12	4-12	4-12	4-12	4-12
Cool/warm foods:	Act.	4-13	4-13	4-13	4-13	4-13	4-13	4-13	4-13	4-13	4-13
Hamburger:	Act.	4-14	4-14	4-14	4-14	4-14	4-14	4-14	4-14	4-14	4-14
Rating of Group Confusion											
No confusion		No	No	No	No	No	No	No	No	No	No
Little confusion		Lit.	Lit.	Lit.	Lit.	Lit.	Lit.	Lit.	Lit.	Lit.	Lit.
Moderate confusion		Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.
Much confusion		Much	Much	Much	Much	Much	Much	Much	Much	Much	Much
If only a few students											
are confused, list them											
by name or ID no.											

UNIT IV, CORE B
ACTIVITY 4-10: "Decomposition In Class"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: (Number) Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #			Game #	Slides (show slide nos.)	Transparency #			Card(s) #	Tape(s) #	Other #
	#	#	#			#	#	#			
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

BSCS Evaluation: EMH Feedback Form 1c

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Are any students having difficulty completing Worksheet 4-4?
☐ No ☐ Yes: How many? ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ all: Comment.

18. Concern (or questions) about content:

19. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-10: "Decomposition In Class"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

- ☐ how you organized materials or class.
- ☐ things added (a question, a picture, etc.).
- ☐ equipment, supplies, visual aids.
- ☐ things that went wrong, misunderstandings.
- ☐ what you would do differently or avoid next time.

THE STUDENTS

- ☐ who had problems and what they were.
- ☐ how someone "caught on" (or who never did).
- ☐ who was really "turned off" (or on).
- ☐ reactions of parents, teachers, students.
- ☐ special evidence of learning or applying ideas.

- ☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.

MATERIALS

*1 Rubber band per/student
2 or 3 Pill bugs per/student
1 Plastic tumbler per/student
*Leaves (dried)

(Continued on next page)

*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-11. Making A Pill Bug Habitat (Pillarium)

This activity will allow students to view some decomposers in action. It will help further develop the idea of breakdown of organic matter and the omnipresence of the creatures which cause the breakdown. In addition students will have some concrete experiences caring for a living thing that they may not normally have contact with or even think about.

Teacher Preparation:

In your materials kit you have been given about 50 pill bugs. These have been provided only in case you live in an area where you cannot easily trap some or the weather is such that it would not be possible.

About two days before you set up the pillaria in this activity you will want to set traps for isopods (more accurate name for pill bugs, sow bugs, etc.)

S FOR THIS ACTIVITY

S:

ppreciate the cycling relationships of the
aterials and organisms in the environment
hrough:

. Understanding of what a cycle is.

. Understanding of the role of decomposers.

ECTIVES:

now the habitat requirements of microbes
nd other decomposers.

ndicate how knowledge of decomposers can
mprove man's environment.

TEACHING STRATEGIES

Making A Pill Bug Habitat (Pillarium)

ill allow students to view some
action. It will help further develop
akdown of organic matter and the
the creatures which cause the break-
ion students will have some concrete
ing for a living thing that they may
ve contact with or even think about.

tion:

ls kit you have been given about 50 pill
ve been provided only in case you live
e you cannot easily trap some or the
that it would not be possible.

efore you set up the pillaria in this
l want to set traps for isopods (more
r pill bugs, sow bugs, etc.)

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-11. MAKING A PILL BUG HABITAT (PILLARIUM)

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have made a pill bug habitat.
--have observed and recorded changes in the pill bug habitat.
--have participated in a discussion of the pill bug and its habitat.

ACTIVITY 4-11

(68)

MATERIALS

*Potting soil
Small sponges
*Toothpicks
*6 Potatoes
*Knife

Diagram 4-4

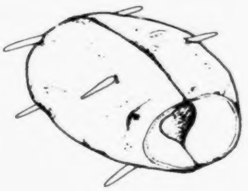
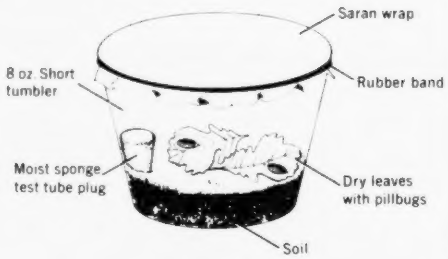


Diagram 4-5



*Not furnished in materials kit

TEACHING STRATEGIES

Although land isopods can be collected in most areas of the United States by searching under rocks and logs, collection can be simplified by the use of traps made from potatoes.

Cut a large white potato in half lengthwise. Scoop out the middle leaving a crust about 1/3 - 1/2 inch thick. Secure the two halves together again with toothpicks. A hole should be scooped out of one end of the potato for an entrance. (See Diagram 4-4.)

The traps should be placed under trees or shrubs in places where you can find some isopods. Leaves and soil should be used to partially cover the potato trap. If the ground area is very dry, water should be poured on the area around the potato.

After 24 to 48 hours, the traps generally will contain isopods, depending upon the number in your location. If animals are scarce, a number of traps should be placed in different areas.

Involve your students in making the traps and setting the traps two days before you proceed with the rest of this activity.

When you have gathered your catch from your traps and have combined them with those provided, proceed to set up the pillaria as follows:

1. Set up your own pillarium before class to serve as a model for students.

2. Provide each student with the materials shown in Diagram 4-5.

3. Show students your model pillarium.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

nd isopods can be collected in most areas of
States by searching under rocks and logs,
can be simplified by the use of traps made
es.

white potato in half lengthwise. Scoop
dle leaving a crust about 1/3 - 1/2 inch
ure the two halves together again with tooth-
ole should be scooped out of one end of the
n entrance. (See Diagram 4-4.)

hould be placed under trees or shrubs in places
n find some isopods. Leaves and soil should
artially cover the potato trap. If the ground
dry, water should be poured on the area
otato.

48 hours, the traps generally will contain
pending upon the number in your location. If
scarce, a number of traps should be placed in
reas.

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ys before you proceed with the rest of this

e gathered your catch from your traps and have
m with those provided, proceed to set up the
follows:

your own pillarium before class to serve as a
r students.

each student with the materials shown in
4-5.

dents your model pillarium.

MATERIALS

TEACHING STRATEGIES

4. Have each student set up a similar pillarium as directed by Diagram 4-5. Each should include: Saran Wrap top, thin layer of soil covering the bottom, dried leaves, small moistened sponge, and his "share" of the pill bugs.

5. Caution students that the sponge must be kept moist or the pill bugs might die.

WOR
TIM

After the students have set up their pill bug habitat, mention to them that they will be expected to observe the activity of the pill bugs every day for a week. Some observable changes in the leaves should occur during this week. No formal records will be kept for this activity since the compost activity will be going on at the same time. Simply allow students to have fun watching the sow bugs each day. Focus their attention on only one aspect of their habitat -- the dried leaves. Ask them to watch for any changes in the leaves. Some observable changes in the leaves should occur during this week. When they have noted the changes discuss the results as follows:

WAITING TI

ABOUT ON
WEEK LAT

WHAT HAS HAPPENED TO THE LEAVES?

TEACHING STRATEGIES

ch student set up a similar pillarium as
d by Diagram 4-5. Each should include: Saran
p, thin layer of soil covering the bottom,
eaves, small moistened sponge, and his "share"
pill bugs.

students that the sponge must be kept moist
pill bugs might die.

WORK TIME

tudents have set up their pill bug habitat,
them that they will be expected to observe the
the pill bugs every day for a week. Some
changes in the leaves should occur during this
ormal records will be kept for this activity
ompost activity will be going on at the same
ly allow students to have fun watching the
ch day. Focus their attention on only one
heir habitat -- the dried leaves. Ask them
r any changes in the leaves. Some observable
the leaves should occur during this week.
ave noted the changes discuss the results as

WAITING TIME

ABOUT ONE
WEEK LATER

AS HAPPENED TO THE LEAVES?

ANTICIPATED STUDENT BEHAVIORS

Students:

--respond, "They have changed," "The pill bugs have eaten parts of the leaves."

MATERIALS

TEACHING STRATEGIES

WHAT DO WE CALL ORGANISMS THAT BREAKDOWN THINGS LIKE THIS?

Accept decomposers and scavengers as the best answers and review these words if they do not state them.

WHAT ARE SOME OTHER DECOMPOSERS OR SCAVENGERS?

If answers are not forthcoming remind them of Slides 4-13 through 4-21 in Activity 4-9.

The containers can be dismantled at this time and the pill bugs released outside or you may have all the contents placed in one large container for continuing the observation. They may become another set of classroom pets that can be kept with minimal effort. Periodically add small pieces of potato to their container, more leaves, and small amounts of moisture.

Continue recording on Tallysheet 4-4.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
DO WE CALL ORGANISMS THAT BREAKDOWN THINGS THIS?	--respond, "Decomposers," "Scavengers."
omposers and scavengers as the best answers and se words if they do not state them.	
ARE SOME OTHER DECOMPOSERS OR SCAVENGERS?	--recall previous experiences and relate slides viewed earlier and say, "Worms," "Microbes," "Fungi," "Ants," etc.
are not forthcoming remind them of Slides 4-13 21 in Activity 4-9.	
ners can be dismantled at this time and the pill sed outside or you may have all the contents one large container for continuing the observa- y may become another set of classroom pets that t with minimal effort. Periodically add small potato to their container, more leaves, and nts of moisture.	
ecording on Tallysheet 4-4.	

UNIT IV, CORE B
ACTIVITY 4-11: "Making A Pill Bug Habitat (Pillarium)"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ______ ______ ______ ______
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ______ ______ ______ ______
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is
☐ Of value--needs the revision suggested
☐ Worth salvaging--make major changes described
☐ Worthless --drop it

BSCS Evaluation: EMH Feedback Form 1c

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

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8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
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11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Was the method of trapping isopods described in this activity effective?
☐ Yes (about how many did each student get? _____) ☐ No: Comment.

18. What changes did the students observe in their pillaria over the week?

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-11: "Making A Pill Bug Habitat (Pillarium)"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:

   b. Understanding of the role of decomposers.

   d. Recognition of examples of man's impact upon the environment.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.

2. Indicate how knowledge of decomposers can improve man's environment.

3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

MATERIALS

TEACHING STRATEGIES

Activity 4-12. Wet And Dry

This activity will demonstrate that moisture is essential for a good decomposer habitat. Preliminary discussion should be based upon the previous activity in which the students set up their pill bug habitat.

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--

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

b. Understanding of the role of decomposers.

d. Recognition of examples of man's impact upon the environment.

BJECTIVES:

Know the habitat requirements of microbes and other decomposers.

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-12. WET AND DRY

BSCS

TEACHING STRATEGIES

2. Wet And Dry

y will demonstrate that moisture is essential ecomposer habitat. Preliminary discussion sed upon the previous activity in which the up their pill bug habitat.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--prepare a petri dish with filter paper inside.
--select material sample for testing.
--use medicine dropper to moisten filter paper.
--observe microbe growth in moist dishes and not in dry dishes.
--infer that microbes require some special conditions for growth.
--infer that the absence of a required condition may prevent growth of some microbes.
--associate certain food packaging with prevention of spoilage.

ACTIVITY 4-12

(72)

MATERIALS

- 4 Plastic petri dishes w/covers (9 cm) per student
- 4 Filter paper discs (7 cm) per student
- 1 Medicine dropper per student
- *1 Wax crayon per student
- *Assorted dry materials (for example):
  - Corn flakes
  - Egg noodles
  - Oat flakes
  - Flour
  - Tea
  - Hay
  - Beans dried for cooking
  - Peas dried for cooking
- *Cardboard carton, file drawer, or other dark storage place
- 35mm Slide projector
- Slide 4-23
- Worksheet 4-5
- *Art supplies for poster

*Not furnished in materials kit

TEACHING STRATEGIES

Begin by asking:

WHAT DID WE PUT INTO THE PILL BUG HABITAT?

WHY DO YOU SUPPOSE WE PUT IN THE LEAVES?

WHY DID WE PUT IN THE WET SPONGE?

Discuss the idea that, in addition to a place to live (shelter), most organisms require food and moisture. Ask:

DO WE NEED FOOD AND WATER?

Then, pointing to the class compost pile, say:

DO YOU SUPPOSE THAT OUR COMPOST WOULD DECOMPOSE IF THE PILE WERE COMPLETELY DRY?

DO YOU THINK THAT MICROSCOPIC DECOMPOSERS (MICROBES) ALSO NEED MOISTURE?

Display the assorted dry materials you have selected and ask:

WHAT ARE ALL OF THESE THINGS?

WOULD YOU DESCRIBE THEM AS WET OR DRY?

WHAT WOULD HAPPEN TO THESE DRY THINGS IF THEY GOT WET?

DOES IT MATTER IF DRY FOOD GETS WET?

ACCEPT A
ANSWERS

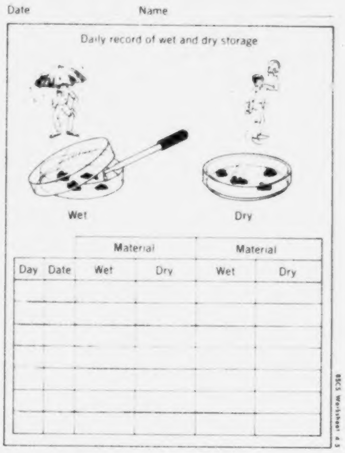
TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
king:	
ID WE PUT INTO THE PILL BUG HABITAT?	--respond, "Soil," "Leaves," "Wet sponge," "Pill bugs."
YOU SUPPOSE WE PUT IN THE LEAVES?	--respond, "For food," "To eat."
D WE PUT IN THE WET SPONGE?	--respond, "For water," "For humidity."
idea that, in addition to a place to live most organisms require food and moisture. Ask:	
NEED FOOD AND WATER?	--respond, "Yes."
ing to the class compost pile, say:	
SUPPOSE THAT OUR COMPOST WOULD DECOMPOSE PILE WERE COMPLETELY DRY?	--possibly will have no idea.
THINK THAT MICROSCOPIC DECOMPOSERS BES) ALSO NEED MOISTURE?	--respond, "Yes," "Maybe," "Don't know."
assorted dry materials you have selected and	
RE ALL OF THESE THINGS?	--respond, "Food."
YOU DESCRIBE THEM AS WET OR DRY?	--respond, "Dry."
OULD HAPPEN TO THESE DRY THINGS IF OT WET?	--should make various guesses.
T MATTER IF DRY FOOD GETS WET?	--should relay experiences and guesses.

ACCEPT ALL ANSWERS

MATERIALS

Slide 4-23

Worksheet 4-5



Date Name

Daily record of wet and dry storage

		Material		Material	
Day	Date	Wet	Dry	Wet	Dry

BSCS Worksheet 4-5

TEACHING STRATEGIES

TODAY WE ARE GOING TO SEE IF IT MAKES ANY DIFFERENCE OR NOT.

Distribute materials and worksheets. Each student should select two materials to be tested.

WHAT ARE ALL THE THINGS YOU HAVE SELECTED?

WOULD YOU DESCRIBE THEM AS WET OR DRY?

A disk of filter paper should be placed in the bottom of each petri dish. The dishes should be arranged on the work space in pairs. Place a sample of different materials (three or four flakes, three or four beans, 1/8 teaspoon of tea, etc.) in each of the pairs of dishes. The filter paper in one dish of each of the pairs should be moistened with a full medicine dropper of water. The paper in the matching dish should remain dry. Replace the covers on all dishes and label "wet" or "dry," the name of the material, the students' initials and date.

Then ask:

S

SELECTION TI

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
E ARE GOING TO SEE IF IT MAKES ANY NCE OR NOT.	
aterials and worksheets. Each student should aterials to be tested.	
SELECTION TIME	
	--select materials that interest them. (Duplication of tests is perfectly acceptable as long as a wide variety of materials is tested by the class.)
E ALL THE THINGS YOU HAVE SELECTED?	--respond, "Food."
OU DESCRIBE THEM AS WET OR DRY?	--respond, "Dry."
lter paper should be placed in the bottom of ish. The dishes should be arranged on the work rs. Place a sample of different materials ur flakes, three or four beans, 1/8 teaspoon in each of the pairs of dishes. The filter dish of each of the pairs should be moistened medicine dropper of water. The paper in the n should remain dry. Replace the covers on all abel "wet" or "dry," the name of the material, initials and date.	--set up experimental dishes.

WORK TIME

ACTIVITY 4-12

⑭

MATERIALS

TEACHING STRATEGIES

WHY DID WE SET UP TWO DISHES FOR EACH MATERIAL?

If students do not see the reason for the control, probe until it is clear that you must have something to compare the wet one to and that each day their observations should be a comparison between the two dishes. Help students each day to realize how valuable the control dish is and also help them verbalize and write the differences on their worksheets.

The assembled dishes should be placed in a dark, dry storage place for several days. Make a paste for this experiment and display it near where the dishes are being stored. Be creative in the poster and include the question being answered in the experiment. By placing this experiment in a specific place you will help students keep the simultaneous experiments separated in their own mind. Use the poster to focus attention on the experiment each time students record their observations. The absolute duration of this activity is not critical. The activity may be terminated as soon as fungus growth develops. It may be extended slightly for your planning convenience.

Use magnifiers to aid in observations!

Ask students to read over what they have recorded. Then ask them to write near the top of the worksheet what question this experiment was trying to answer (why they were doing the experiment). At the bottom of the worksheet, ask them to write what they found out. Help those who need it to put their ideas in writing.

TEACHING STRATEGIES

WE SET UP TWO DISHES FOR EACH MATERIAL?

do not see the reason for the control, probe
clear that you must have something to compare
to and that each day their observations should
son between the two dishes. Help students
realize how valuable the control dish is and
em verbalize and write the differences on their

d dishes should be placed in a dark, dry
e for several days. Make a paste for this
nd display it near where the dishes are being
creative in the poster and include the question
ed in the experiment. By placing this experi-
ecific place you will help students keep the
experiments separated in their own mind. Use
focus attention on the experiment each time
ord their observations. The absolute duration
vity is not critical. The activity may be
s soon as fungus growth develops. It may be
ghtly for your planning convenience.

rs to aid in observations!

to read over what they have recorded. Then
write near the top of the worksheet what
s experiment was trying to answer (why they
he experiment). At the bottom of the worksheet,
write what they found out. Help those who need
ir ideas in writing.

ANTICIPATED STUDENT BEHAVIORS

Students:

--should relate the idea of a control, i.e., to have something to compare with later to see if anything would have happened without the water. Since the only thing that was different was the addition of water we will be able to know that it caused the change.

--place their assembled dishes in the storage place. Make daily observations.

MATERIALS

TEACHING STRATEGIES

When the observations have been made and the worksheets completed, use the following questions as a basis for discussing the results:

> LOOK AT YOUR WORKSHEETS. WHAT HAPPENED TO OUR DRIED FOOD WHEN WE MADE IT WET?
>
> DID IT DECOMPOSE?
>
> WHAT CAUSED THE FOOD TO GET MOLDY AND DECOMPOSE?
>
> > If students do not answer this, ask:
> >
> > WHY DIDN'T THE DRY FOOD GET MOLDY AND DECOMPOSE?
> >
> > Remind students that the only difference between the dishes was that one had water and the other didn't and therefore, wetness is a condition necessary for the mold to grow.
>
> WHAT DO YOU SUPPOSE NEEDS THE WATER?
>
> WHAT ELSE DID WE LOOK AT RECENTLY THAT NEEDED WATER?
>
> DO DEAD THINGS NEED WATER?
>
> ARE MOLDS ALIVE?

Accept any level of interest in this question and any answer.

Then ask:

> HOW ARE THESE FOODS USUALLY STORED?

St

--

--

--r

--r

--r

--r

--r

--p

--p

--r

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
rvations have been made and the worksheets e the following questions as a basis for dis- esults:	--complete worksheets.
YOUR WORKSHEETS. WHAT HAPPENED TO OUR OD WHEN WE MADE IT WET?	--examine their results and state, "They molded," "They got gushy," "They got soggy."
ECOMPOSE?	--respond, "Yes."
SED THE FOOD TO GET MOLDY AND DECOMPOSE?	--respond, "The water."
students do not answer this, ask:	
DIDN'T THE DRY FOOD GET MOLDY AND OMPOSE?	--respond, "No water," "Not wet."
ind students that the only difference between dishes was that one had water and the er didn't and therefore, wetness is a dition necessary for the mold to grow.	
YOU SUPPOSE NEEDS THE WATER?	--respond, "The molds."
E DID WE LOOK AT RECENTLY THAT NEEDED	--recall, "Sow bugs."
THINGS NEED WATER?	--probably say, "No."
S ALIVE?	--probably will say, "Yes," or be perplexed.
vel of interest in this question and any	
THESE FOODS USUALLY STORED?	--respond, "In dry places."

ACTIVITY 4-12
(76)

MATERIALS	TEACHING STRATEGIES
	WHAT KIND OF PACKAGES DO THEY USUALLY COME IN? Continue recording the appropriate information on Tallysheet 4-4.

TEACHING STRATEGIES

IND OF PACKAGES DO THEY USUALLY COME IN?

cording the appropriate information on
4-4.

ANTICIPATED STUDENT BEHAVIORS

Students:

--respond with appropriate answers that relate dryness and air tightness.

UNIT IV, CORE B
ACTIVITY 4-12: "Wet And Dry"

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

Activity name suggested by class:

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

HIGH INTEREST → ________ ________ ________ ________

HARD TO RATE → ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☑ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did students see the need for a control?
☐ Yes ☐ No: How many did not understand? ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ all: Comment.

18. Concern (or questions) about content:

19. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-12: "Wet And Dry"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - b. Understanding of the role of decomposers.
    - d. Recognition of examples of man's impact upon the environment.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

MATERIALS

TEACHING STRATEGIES

Activity 4-13. Cool And Warm

In this activity students will again associate microbes with the spoilage of food. They will realize the need to refrigerate certain foods to prevent their spoilage. The magnitude of the results will vary depending on what foods the students bring in. Capitalize on the variety of results to illustrate that refrigeration is more critical with some foods than with others.

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UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-13. COOL AND WARM

BSCS

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

b. Understanding of the role of decomposers.

d. Recognition of examples of man's impact upon the environment.

OBJECTIVES:

Know the habitat requirements of microbes and other decomposers.

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

TEACHING STRATEGIES

3. Cool And Warm

vity students will again associate microbes
ilage of food. They will realize the need to
certain foods to prevent their spoilage. The
the results will vary depending on what foods
bring in. Capitalize on the variety of
llustrate that refrigeration is more critical
ods than with others.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- --have brought a sample of food from home.
- --have identified the foodstuff brought from home and stated reason for refrigeration.
- --have divided the sample in half, placed both portions in containers, properly labeled both samples, and placed one in the refrigerator and one in the classroom.
- --have observed both bowls for a week and recorded observations on Worksheet 4-6.
- --have given a report to the class discussing the results of the experiment.
- --have inferred that spoilage is decomposition and is caused by microbes.
- --have concluded that refrigeration reduces decomposition and therefore, spoilage.

ACTIVITY 4-13

(78)

MATERIALS

- *Ice chest or refrigerator
- *2 Baby food jars or milk cartons per student
- *Saran Wrap
- *Food samples usually refrigerated
- *35mm Slide projector
- Slide 4-24
- Worksheet 4-6
- *Art supplies for poster

*Not furnished in materials kit

TEACHING STRATEGIES

Begin by reviewing what was learned in Activity 4-12 about how decomposition may be prevented in some foods by storing them in a drying condition.

Then ask:

> CAN ALL FOODS BE STORED DRY?
>
> WHICH ONES CAN NOT BE STORED DRY?

Assign the students to bring from home a small sample of food which is kept in the refrigerator. (It is advisable to have a few foodstuffs on hand which are normally refrigerated for students who forget to bring samples from home.)

The next day ask each student to identify this foodstuff and explain why he thinks it is kept in the refrigerator.

After all students have shown their food, ask:

> WHAT WOULD HAPPEN IF YOU DID NOT KEEP IT IN THE REFRIGERATOR?
>
> LET'S SEE WHAT HAPPENS IF WE LEAVE PART OF YOUR FOOD OUT OF THE REFRIGERATOR.

Have students divide their food in half in whatever way is appropriate for the food they have brought.

Put each half into a jar or milk carton and label with the student's name and either "refrigerator" or "room." Have the students cover the containers with Saran Wrap and place one container in the refrigerator or cooler and the other in the room in a warm, dark place.

St

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
eviewing what was learned in Activity 4-12 about osition may be prevented in some foods by storing drying condition.	
LL FOODS BE STORED DRY?	--respond, "No."
ONES CAN NOT BE STORED DRY?	--respond, "Milk," "Coke," "Catsup," etc.
students to bring from home a small sample of is kept in the refrigerator. (It is advisable few foodstuffs on hand which are normally ed for students who forget to bring samples from	
ay ask each student to identify this foodstuff n why he thinks it is kept in the refrigerator.	--identify foodstuff and state reasons for keeping it in refrigerator: "Keep it cold," "Keep it from rotting," "Don't know."
students have shown their food, ask:	
WOULD HAPPEN IF YOU DID NOT KEEP IT IN EFRIGERATOR?	--respond, "I don't know," "Melt," "Rot."
SEE WHAT HAPPENS IF WE LEAVE PART OF YOUR OUT OF THE REFRIGERATOR.	
ts divide their food in half in whatever way ate for the food they have brought.	
alf into a jar or milk carton and label with the name and either "refrigerator" or "room." Have ts cover the containers with Saran Wrap and place ner in the refrigerator or cooler and the other n in a warm, dark place.	

MATERIALS

Slide 4-24

Worksheet 4-6

Date Name

Record of my food
(Food)

Refrigerator Cold	Room Warm
Date	Date
Date	Date
Date	Date
Date	Date
Date	Date
Date	Date
Date	Date
Date	Date

TEACHING STRATEGIES

Again make a poster to display where you are keeping this experiment stored. Do not keep it in the same place as the compost or the "wet-dry" foods. Separate these experiments physically in the room so students do not get them confused. Make your reference poster creative and related to "cold-warm" conditions. Make it distinctive enough so it doesn't look at all like the "wet-dry" poster.

Have the students observe both containers each day for the next week to notice differences. Many interesting changes should take place, depending on the variety of beautiful molds. In addition, smells will develop that are not so beautiful. Changes in texture and color will accompany the other changes. Try to make students aware of these changes through your questioning as they work in the lab by asking questions like those outlined in the strategy of Activity 4-12. Have the students record their observations each day on Worksheet 4-6. Encourage them to keep good records of the kinds of changes mentioned above. Assist them in their verbalization and writing of the results on their worksheets. The food at room temperature should spoil, mold, and change much more quickly than the refrigerated ones.

RECORD RESU
2 TO 5 DA

When the results are obviously different (2 to 5 days), have each student use his worksheet for notes and give a report to the class on the results of his experiment. Have each student explain the difference between refrigeration and nonrefrigeration of his food and, in as much detail as he can, how his food changed.

Try to capitalize on each student report, not by repeating anything the student said, but by emphasizing the value of refrigeration on that particular food.

TEACHING STRATEGIES

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RECORD RESULTS
2 TO 5 DAYS

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talize on each student report, not by repeat- the student said, but by emphasizing the frigeration on that particular food.

ANTICIPATED STUDENT BEHAVIORS

Students:

ACTIVITY 4-13

(80)

MATERIALS	TEACHING STRATEGIES
	After all student reports have been given, ask a few unifying questions such as: WHAT HAPPENS TO MOST FOODS IF WE TAKE THEM OUT OF THE REFRIGERATOR AND LEAVE THEM OUT? WHAT CAUSES THEM TO SPOIL? SHOULD WE EAT SPOILED FOOD? WHY NOT? WHY KEEP FOODS IN THE REFRIGERATOR? WHY DO YOU THINK THAT REFRIGERATION KEEPS FOOD FROM SPOILING? End this activity by asking: LET'S SEE HOW MANY FOODS WE CAN LIST THAT SHOULD BE KEPT IN THE REFRIGERATOR. When in doubt about a particular food, advise students that it usually will not hurt to put the food in the refrigerator so put it in. Continue recording the time and confusion information requested on Tallysheet 4-4.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
student reports have been given, ask a few uestions such as:	
HAPPENS TO MOST FOODS IF WE TAKE THEM OUT OF EFRIGERATOR AND LEAVE THEM OUT?	--should compare the results of individual student reports and generalize by saying, "Many foods spoil, rot, or get overripe."
CAUSES THEM TO SPOIL?	--recall past work and answer, "Microbes," "Decomposers," "Molds."
D WE EAT SPOILED FOOD?	--respond, "No."
OT?	--respond, "It would make you sick," "It smells."
EEP FOODS IN THE REFRIGERATOR?	--infer that refrigeration reduces spoilage and danger of illness.
O YOU THINK THAT REFRIGERATION KEEPS FOOD FROM ING?	--infer that it is too cold for microbes to grow.
ctivity by asking:	
SEE HOW MANY FOODS WE CAN LIST THAT SHOULD PT IN THE REFRIGERATOR.	--respond with many foods.
ubt about a particular food, advise students ually will not hurt to put the food in the or so put it in.	
ecording the time and confusion information on Tallysheet 4-4.	

UNIT IV, CORE B
ACTIVITY 4-13: "Cool And Warm"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			[illegible]	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Were students able to write down observations of their food?
☐ Yes ☐ No: How many were unable? ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ all: Comment.

18. Concern (or questions) about content:

19. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-13: "Cool And Warm"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:

   b. Understanding of the role of decomposers.

   d. Recognition of examples of man's impact upon the environment.

2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

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ACT

MATERIALS

TEACHING STRATEGIES

Activity 4-14. The Hamburger Lab

In this activity students will compare spoilage in two hamburger samples left at room temperature for three days. One sample is left uncooked and the other is boiled for fifteen minutes. Students will conclude that boiling food aids in reducing contamination and spoilage.

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UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-14. THE HAMBURGER LAB

BSCS

OCUS FOR THIS ACTIVITY

OALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

b. Understanding of the role of decomposers.

d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

Know the habitat requirements of microbes and other decomposers.

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

TEACHING STRATEGIES

4. The Hamburger Lab

ivity students will compare spoilage in two
amples left at room temperature for three days.
s left uncooked and the other is boiled for
tes. Students will conclude that boiling
reducing contamination and spoilage.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have properly set up the cooked versus uncooked hamburger experiment.
--have observed changes in hamburger associated with cooking.
--have recorded observations at the beginning of the experiment.
--have observed experiment for three days and recorded observations on day three.
--have described changes which occurred in the hamburger over three days.

ACTIVITY 4-14

MATERIALS

Hot plate
Teaspoon measure
*2 Teaspoons fresh ground beef per student
2 Pieces of cotton per student
*Masking tape for labeling
*Water (supply of)
2 Test tubes per student, Pyrex (15 X 150 mm)
Test tube holder
Worksheet 4-7
Beaker for boiling water, 1000 ml
Test tube brush
*35mm Slide projector
Slide 4-25

*Not furnished in materials kit

TEACHING STRATEGIES

Begin by saying:

> WHICH DO YOU THINK WOULD DECOMPOSE FASTER -- COOKED FOOD OR UNCOOKED FOOD?
>
> LET'S FIND OUT! EACH OF YOU WILL NEED THE FOLLOWING THINGS FROM THE SUPPLY TABLE: (As you tell the students, write these items on the chalkboard.)
>
> 2 TEASPOONS OF GROUND BEEF
> 2 TEST TUBES
> 2 PIECES OF COTTON FOR PLUGS ON TEST TUBES
> MASKING TAPE -- TWO STRIPS PER STUDENT FOR MARKING TEST TUBES
> BEAKER OF WATER

Instruct the students to get supplies and return to desks.

After the students have obtained their supplies, say:

> SHAPE EACH PIECE OF HAMBURGER SO THAT IT WILL FIT INTO THE TEST TUBE. PUT ONE PIECE INTO EACH TEST TUBE AND FILL EACH HALF FULL OF WATER. BE SURE THE HAMBURGER IS UNDER THE WATER.

TEACHING STRATEGIES

saying:

H DO YOU THINK WOULD DECOMPOSE FASTER --
ED FOOD OR UNCOOKED FOOD?

S FIND OUT! EACH OF YOU WILL NEED THE
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INTO THE TEST TUBE. PUT ONE PIECE INTO EACH
TUBE AND FILL EACH HALF FULL OF WATER. BE
THE HAMBURGER IS UNDER THE WATER.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have inferred that changes were caused by microbes.
--have inferred that boiling of food kills microbes and thus reduces spoilage.

Students:

--respond with their guesses.

--shape and place hamburger and water in test tubes.

MATERIALS

TEACHING STRATEGIES

NOW PUT A PIECE OF COTTON IN THE TOP OF EACH TUBE.

WHAT SHOULD WE DO WITH THESE TWO TEST TUBES?

> If students do not get this experimental design, ask:
>
> WHAT DID WE SAY WE WANTED TO FIND OUT?
>
> SO WHAT SHOULD WE DO?
>
> If students still have trouble, explain the procedure comparing it to the wet-dry experiment. Emphasize the need for control!

TAKE A PIECE OF MASKING TAPE AND LABEL ONE OF THE TEST TUBES WITH YOUR NAME, #1, AND "UNCOOKED." LABEL THE OTHER TEST TUBE WITH YOUR NAME, #2, AND "COOKED." PLACE THE TAPE AROUND THE TUBE ABOVE THE WATER LEVEL.

Then ask:

WHY DO WE HAVE TWO TEST TUBES?

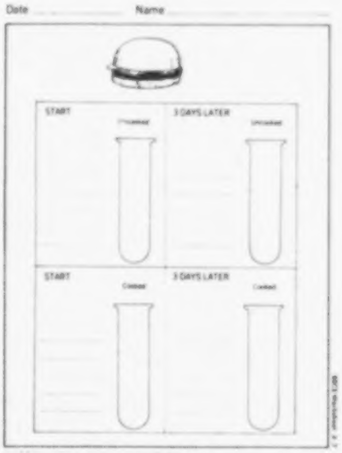
TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
UT A PIECE OF COTTON IN THE TOP OF EACH TUBE.	--stopper tube with cotton.
SHOULD WE DO WITH THESE TWO TEST TUBES?	--respond, "Cook one and not the other."
If students do not get this experimental design, ask:	
WHAT DID WE SAY WE WANTED TO FIND OUT?	--respond, "Which would decompose faster, cooked or uncooked."
SO WHAT SHOULD WE DO?	--respond, "Cook one and not the other."
If students still have trouble, explain the procedure comparing it to the wet-dry experiment. Emphasize the need for control!	
A PIECE OF MASKING TAPE AND LABEL ONE OF THE TUBES WITH YOUR NAME, #1, AND "UNCOOKED." LABEL THER TEST TUBE WITH YOUR NAME, #2, AND "COOKED." THE TAPE AROUND THE TUBE ABOVE THE WATER LEVEL.	--label test tubes.
O WE HAVE TWO TEST TUBES?	--will, we hope, have the idea of control and respond, "Control," "A tube to compare with."

ACTIVITY 4-14

MATERIALS

Slide 4-25

Worksheet 4-7


Date Name

START

3 DAYS LATER

TEACHING STRATEGIES

> BRING THE "COOKED HAMBURGER" TEST TUBE TO THE SUPPLY TABLE AND PUT IT IN THE BOILING WATER. BOIL IT FOR 15 MINUTES. WATCH IT WHILE IT'S COOKING TO SEE WHAT HAPPENS.

To The Teacher.

All sixteen tubes can be boiled at one time in a beaker of water on your hot plate.

OBSERVATION

After 15 minutes, have the students remove their test tubes from the water with test tube holders and put them with the "uncooked hamburger" test tubes. Have students use a 250 ml beaker as a "holder" for their test tubes while working with them and during storage.

Distribute Worksheet 4-7 and say:

> WE ARE GOING TO LET THESE TWO TEST TUBES SIT FOR THREE DAYS TO SEE WHAT HAPPENS. IN ORDER TO COMPARE THEM, WE NEED TO WRITE DOWN WHAT WE SEE TODAY.
>
> TAKE YOUR "UNCOOKED" TEST TUBE FROM THE BEAKER AND OBSERVE IT CAREFULLY. MAKE A DRAWING ON YOUR WORKSHEET OF WHAT YOU SEE AND WRITE A BRIEF DESCRIPTION BELOW IT.

ALLOW PLENTY OF
HELP STUDENTS WITH VERBALI

TEACHING STRATEGIES

THE "COOKED HAMBURGER" TEST TUBE TO THE
TABLE AND PUT IT IN THE BOILING WATER.
IT FOR 15 MINUTES. WATCH IT WHILE IT'S
NG TO SEE WHAT HAPPENS.

her.

tubes can be boiled at one time in a beaker of
ur hot plate.

ANTICIPATED STUDENT BEHAVIORS

Students:

--cook hamburger and observe changes while the meat is cooking.

OBSERVATION TIME

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ter with test tube holders and put them with the
amburger" test tubes. Have students use a
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SERVE IT CAREFULLY. MAKE A DRAWING ON YOUR
EET OF WHAT YOU SEE AND WRITE A BRIEF
PTION BELOW IT.

--observe test tube #1 and describe how it looks by writing and/or drawing it.

ALLOW PLENTY OF WORK TIME
HELP STUDENTS WITH VERBALIZATION AND WRITING

MATERIALS

TEACHING STRATEGIES

S

NOW TAKE THE TEST TUBE WITH THE COOKED HAMBURGER, #2, AND OBSERVE IT CAREFULLY. ON THE BOTTOM OF YOUR WORKSHEET, AGAIN MAKE A DRAWING OF WHAT YOU SEE AND WRITE A BRIEF DESCRIPTION.

ALLOW PLENTY OF WO
HELP STUDENTS WITH VERBALIZA

When students have completed this part of the worksheet have them think about what they believe will happen in this experiment. Have each student write down his prediction for the cooked and uncooked hamburger in the space provided in the left margin of the worksheet.

Have students now store their test tubes in the appropriate place you have selected as "Hamburger Corner." Again have students help you make a poster depicting the experiment.

Students will not make further written observations on this experiment until three days have passed, but do allow them time each day to observe the test tubes for changes if they desire. After three days, have students get their tubes and their worksheets.

Begin the class by saying:

BEFORE WE TALK ABOUT HOW THE HAMBURGER HAS CHANGED, TAKE YOUR "UNCOOKED" TEST TUBE, #1, AND LOOK AT IT CAREFULLY. ON YOUR WORKSHEET WRITE DOWN WHAT IT LOOKS LIKE NOW AND MAKE A DRAWING OF IT.

WORK TIME

TEACHING STRATEGIES

KE THE TEST TUBE WITH THE COOKED HAMBURGER,
D OBSERVE IT CAREFULLY. ON THE BOTTOM OF
ORKSHEET, AGAIN MAKE A DRAWING OF WHAT YOU
D WRITE A BRIEF DESCRIPTION.

ALLOW PLENTY OF WORK TIME
HELP STUDENTS WITH VERBALIZATION AND WRITING

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OUR "UNCOOKED" TEST TUBE, #1, AND LOOK AT
EFULLY. ON YOUR WORKSHEET WRITE DOWN WHAT
KS LIKE NOW AND MAKE A DRAWING OF IT.

ANTICIPATED STUDENT BEHAVIORS

Students:

--observe and describe test tube #1 by writing and/
or drawing it.

MATERIALS

TEACHING STRATEGIES

TAKE THE "COOKED" TEST TUBE, #2, AND LOOK AT IT CAREFULLY. DRAW AND DESCRIBE THE "COOKED" HAMBURGER.

HAS A CHANGE TAKEN PLACE IN THE TEST TUBE?

WHAT HAPPENED IN THE UNCOOKED TEST TUBE?

HOW IS IT DIFFERENT FROM WHEN WE STARTED THE EXPERIMENT?

ACCEPT A
ANSWER

WHAT MADE IT CHANGE?

WHAT HAPPENED IN THE COOKED TEST TUBE?

WHY DIDN'T THE COOKED HAMBURGER CHANGE?

Explain that it was the heat, not the water, that killed the microbes. The meat could have been fried or baked or grilled with the same result.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
THE "COOKED" TEST TUBE, #2, AND LOOK AT IT ULLY. DRAW AND DESCRIBE THE "COOKED" RGER.	--observe and describe test tube #2 by writing and/or drawing it.
WORK TIME	
CHANGE TAKEN PLACE IN THE TEST TUBE?	--respond, "Yes."
HAPPENED IN THE UNCOOKED TEST TUBE?	--respond, "It rotted," "It looks bad," "It is decaying or decomposing."
S IT DIFFERENT FROM WHEN WE STARTED THE IMENT?	--respond, "It stinks," "The color changed," "It's slimy," "It has decomposed."
ACCEPT ALL ANSWERS	
MADE IT CHANGE?	--infer microbes.
HAPPENED IN THE COOKED TEST TUBE?	--respond, "Nothing," "Not much difference."
IDN'T THE COOKED HAMBURGER CHANGE?	--infer that the microbes were killed or kept from growing by boiling.
at it was the heat, not the water, that killed es. The meat could have been fried or baked or h the same result.	

MATERIALS

TEACHING STRATEGIES

WHAT OTHER WAYS DO WE KNOW THAT KEEP MICROBES FROM GROWING ON FOOD?

WHAT DO THESE THREE WAYS OF PREVENTING MICROBES FROM GROWING TELL US ABOUT FOOD?

WHAT DO THESE TELL US ABOUT MICROBES?

ARE MICROBES ALIVE?

WHAT ARE WAYS WE CAN KILL MICROBES?

SPEND AS MUCH TIME ON THIS T
NECESSARY AND AS THE INTERES
STUDENTS IND

Have students end this experiment by writing the conclusion of the experiment in the space provided in the right hand margin of the worksheet. Collect their worksheets and use their statements as an indication of the success of the experiment in developing the cooking concept.

Dispose of the waste hamburger appropriately and use test tube brush to clean the tubes.

Complete Tallysheet 4-5 as a rating of student ability to observe and record. Complete recording on Tallysheet 4-4 and send it in. After reviewing Worksheet 4-7 and completing Tallysheet 4-5, send these student worksheets to BSCS.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
HER WAYS DO WE KNOW THAT KEEP MICROBES OWING ON FOOD?	--respond, "Keep food cold," "Keep food in the refrigerator," "Keep food dry."
THESE THREE WAYS OF PREVENTING MICROBES OWING TELL US ABOUT FOOD?	--conclude that heat, cold, and dryness help keep food from spoiling.
THESE TELL US ABOUT MICROBES?	--conclude that they need certain conditions to grow and can be stopped.
ROBES ALIVE?	--should guess that they are alive.
E WAYS WE CAN KILL MICROBES?	--respond, "Boil," "Dry," "Cool."

SPEND AS MUCH TIME ON THIS TOPIC AS YOU FEEL IS NECESSARY AND AS THE INTEREST AND NEEDS OF YOUR STUDENTS INDICATE

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Teacher ____________________
Date ____________________

UNIT IV, CORE B
TALLYSHEET 4-5: Rating of Student Worksheet 4-7
Activity 4-14: "The Hamburger Lab"

Please rate each student on the amount of help needed and the aptness of his observations in completing Worksheet 4-7 by using the following criteria:

Rating Help Needed By Student

Written on own.	This category should be checked if the student needs little help in recording observations on Worksheet 4-7.
Written, much help.	This category should be checked if the student needs a great deal of help in recording observations on Worksheet 4-7.
Not written.	Check this category if the student has not completed Worksheet 4-7.

Rating of Student Observations

Good.	This category should be checked if student observations are fairly comprehensive in terms of color, texture, size, smell, etc.
Off track.	This category should be checked if student observations lack important changes or include many irrelevant details.
Reactions.	This category should be checked if student observations are subjective rather than objective observations.
Entries lack meaning.	This category should be checked if student observations are not readable or don't make sense. Also check this category if there are no entries.

		Written on own	Written, much help	Not Written	Good	Off track	Subjective Reactions	Entries Lack meaning
Attach ID list here.	01							

important changes or include many irrelevant details.

Reactions. This category should be checked if student observations are subjective rather than objective observations.

Entries lack meaning. This category should be checked if student observations are not readable or don't make sense. Also check this category if there are no entries.

		Written on own	Written, much help	Not Written	Good	Off track	Subjective Reactions	Entries Lack meaning
Attach ID list here.	01							

UNIT IV, CORE B
ACTIVITY 4-14: "The Hamburger Lab"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

BSCS Evaluation: EMH Feedback Form 1c

Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. About how many students seem to understand the purpose of this experiment?
☐ None ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ all: Comment.

18. Concern (or questions) about content:

19. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-14: "The Hamburger Lab"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.
☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - b. Understanding of the role of decomposers.
    - c. Realization that certain materials are in finite supply.
    - d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

MATERIALS

TEACHING STRATEGIES

Activity 4-15. Stor(ing) Problems

In this activity students will visit a grocery store to find out how the grocer deals with the problem of food spoilage. Students will learn what grocery stores do to preserve food. They will also become aware of some of the special problems in preserving very perishable products such as meats, fresh fruits, vegetables, bakery, and dairy products. In the grocery store the various ways the foods are displayed and stored on the

OCUS FOR THIS ACTIVITY

OALS:

. Appreciate the cycling relationships of the materials and organisms in the environment through:

b. Understanding of the role of decomposers.

c. Realization that certain materials are in finite supply.

d. Recognition of examples of man's impact upon the environment.

. Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

. Know the habitat requirements of microbes and other decomposers.

. Indicate how knowledge of decomposers can improve man's environment.

. Conclude that microbes contribute to man's well-being as well as pose problems for man.

UNIT IV.	TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT
CORE B.	DECOMPOSERS IN MY ENVIRONMENT
ACTIVITY 4-15.	STOR(ING) PROBLEMS

BSCS

TEACHING STRATEGIES

15. Stor(ing) Problems

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h as meats, fresh fruits, vegetables, bakery,
oducts. In the grocery store the various
ods are displayed and stored on the

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- *--have participated in the discussion to define questions.*
- *--have visited the grocery store.*
- *--have participated in post-visit discussion.*
- *--have observed the various ways food storage problems are handled in a store.*
- *--have interviewed various people in the grocery store.*

MATERIALS

*Cassette tape recorder (optional)
*Blank cassette(s)
*Question list
Camera (Polaroid Square Shooter)
*Pencil and paper

*Not furnished in materials kit

TEACHING STRATEGIES

shelves and in the supply room should be observed. Interviews with various people in the store such as the general manager, the butcher, the bakery manager, and the produce manager should further establish the store's problems.

Teacher Preparation:

1. Be sure to contact the store manager well in advance (at least one week) of the date you hope to visit the store. Select with him a mutually acceptable date and time for the trip. Also mention specifically who you would like to include or which departments you would like to visit such as the general manager for general remarks, the butcher, the bakery manager, and the produce manager. It is also advisable to call him the day before the scheduled trip to verify that all systems are still "go" for the visit.

2. If you decide to use the tape recorder in the store, ask the manager if this is okay.

The day before the visit ask:

WHERE IS A LOT OF FOOD STORED?

HOW DO THEY STORE ALL THAT FOOD?

WE ARE GOING TO VISIT A GROCERY STORE TOMORROW. WHAT ARE SOME OF THE DIFFERENT PARTS OF THE STORE WE MIGHT VISIT?

S

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ACCEPT AL
ANSWERS

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
in the supply room should be observed. Inter- *various people in the store such as the general* *e butcher, the bakery manager, and the produce* *uld further establish the store's problems.*	
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u decide to use the tape recorder in the store, he manager if this is okay.	
ore the visit ask:	
IS A LOT OF FOOD STORED?	--respond, "Stores," etc.
THEY STORE ALL THAT FOOD?	--should give a variety of responses.
GOING TO VISIT A GROCERY STORE TOMORROW. RE SOME OF THE DIFFERENT PARTS OF THE STORE HT VISIT?	--respond, "Meat section," "Bakery," "Canned foods," "Vegetables and fruits."

ACCEPT ALL ANSWERS

MATERIALS

TEACHING STRATEGIES

BEFORE WE GO, WE SHOULD HAVE SOME QUESTIONS IN MIND TO ASK PEOPLE WORKING THERE. WHAT ARE SOME OF THE THINGS WE COULD ASK ABOUT HOW THEY HANDLE FOOD?

QUESTION TI

ACCEPT AL
ANSWERS

As the students suggest questions, write them on the chalkboard. Pursue this until questions of the following nature have been brought out.

1. What kinds of foods can you store the longest?
2. What kinds of foods spoil the fastest?
3. What are some of the things you do to keep foods from spoiling?
4. Is it against the law to sell food that has been stored a long time?
5. Do foods that spoil easily cost more because they spoil easily?
6. What do you do with spoiled food?
7. How much food has to be disposed of because it has spoiled?
8. Where and how do you store meats?
9. Where and how do you store bakery products?
10. Where and how do you store fresh fruits and vegetables?
11. Where and how do you store dairy products?
12. Does a dented can cause food spoilage?

St

--

TEACHING STRATEGIES

WE GO, WE SHOULD HAVE SOME QUESTIONS IN
ASK PEOPLE WORKING THERE. WHAT ARE SOME
THINGS WE COULD ASK ABOUT HOW THEY HANDLE

QUESTION TIME

ACCEPT ALL ANSWERS

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Pursue this until questions of the following
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are some of the things you do to keep foods
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ed?
and how do you store meats?
and how do you store bakery products?
and how do you store fresh fruits and
ables?
and how do you store dairy products?
a dented can cause food spoilage?

ANTICIPATED STUDENT BEHAVIORS

Students:

--respond with questions that could be asked about storing foods.

ACTIVITY 4-15

MATERIALS

TEACHING STRATEGIES

Divide up the questions evenly between pairs of students and make them responsible for finding the answers. Take paper and pencil, tape recorder, and camera on the trip to help record answers to the questions.

When you arrive at the store tour the store just as a group. Stop at many places and discuss the storage methods that are shown. Start with easy ones that students have had experience with in class, i.e., cold, hot, dry, etc. Then proceed to more subtle ones of wrapping bottles, cans, etc. Do not lecture! Ask students to tell you what they see and why. It might be difficult for students to distinguish between meaningful packaging and gimmicks to sell! Help them.

After the group tour, talk to various people in the store that you have arranged to meet with. Then before leaving the store give students some free time to roam and find other examples on their own.

The day after the visit, discuss all the questions and answers students gathered at the store. Then ask:

> WHY CAN SOME FOODS BE KEPT IN THE GROCERY STORE LONGER THAN OTHERS?
>
> WHAT IS IT THAT DECOMPOSES THE FOOD?
>
> HOW WERE THINGS STORED AT THE STORE?

ACCEPT A
ANSWER

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
the questions evenly between pairs of students them responsible for finding the answers. Take pencil, tape recorder, and camera on the trip cord answers to the questions. arrive at the store tour the store just as a op at many places and discuss the storage methods shown. Start with easy ones that students have ence with in class, i.e., cold, hot, dry, etc. ed to more subtle ones of wrapping bottles, cans, ot lecture! Ask students to tell you what they y. It might be difficult for students to h between meaningful packaging and gimmicks to p them. group tour, talk to various people in the store ave arranged to meet with. Then before leaving give students some free time to roam and find ples on their own. ter the visit, discuss all the questions and udents gathered at the store. Then ask:	Students:
AN SOME FOODS BE KEPT IN THE GROCERY STORE R THAN OTHERS?	--respond, "Some rot faster."
IS IT THAT DECOMPOSES THE FOOD?	--respond, "Microbes," "Molds."
ERE THINGS STORED AT THE STORE?	--respond, "Frozen," "Packaged," "Dried," "Precooked."

ACCEPT ALL
ANSWERS

MATERIALS	TEACHING STRATEGIES
	SHOULD YOU STORE THINGS AT HOME THE WAY THEY ARE STORED IN THE GROCERY STORE? WHY?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
D YOU STORE THINGS AT HOME THE WAY THEY ARE D IN THE GROCERY STORE?	--respond, "Yes."
	--respond, "So they won't rot, decompose."

UNIT IV, CORE B
ACTIVITY 4-15: "Stor(ing) Problems"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No - Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No - Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
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12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Were students able to record the answers to their questions while on the trip?
☐ Yes ☐ No: Comment.

18. Were students able to attend to the goals of the trip (i.e. learning about storage methods)? ☐ Yes ☐ No: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B

ACTIVITY 4-15: "Stor(ing) Problems"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   - b. Understanding of the role of decomposers.
   - d. Recognition of examples of man's impact upon the environment.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

MATERIALS

*Your weekly groceries (at least 30 items of great variety)
Slides 4-26 through 4-28
Worksheet 4-8
*35mm Slide projector

*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-16. Review Of Success

This review of success consists of two parts. In Part I students will discuss real foods and their storage. Part II consists of three multiple choice questions. The questions are designed to be a reward for the work just completed.

Review the last series of experiences your students have had by allowing them to explain how to handle a variety of real and everyday food types. Display a wide variety of real foods. Your weekly groceries or the home economics teacher's would be appropriate!

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-16. REVIEW OF SUCCESS

BSCS

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

b. Understanding of the role of decomposers.

d. Recognition of examples of man's impact upon the environment.

BJECTIVES:

Know the habitat requirements of microbes.

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

TEACHING STRATEGIES

5. Review Of Success

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l discuss real foods and their storage. Part
of three multiple choice questions. The
e designed to be a reward for the work just

ast series of experiences your students have
ing them to explain how to handle a variety of
ryday food types. Display a wide variety of
Your weekly groceries or the home economics
uld be appropriate!

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have answered the three questions on their worksheets.
--have participated in a discussion of food storage using real foods as a basis.

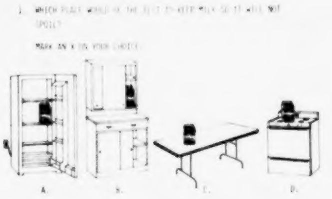
ACTIVITY 4-16

(96)

MATERIALS

Worksheet 4-8

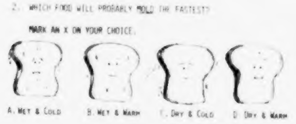
Slide 4-26



1. WHICH PLACE WOULD BE THE BEST TO KEEP MILK SO IT WILL NOT SPOIL?

MARK AN X ON YOUR CHOICE.

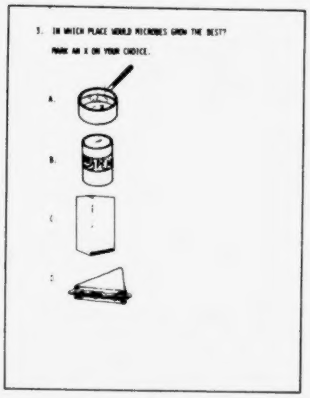
Slide 4-27



2. WHICH FOOD WILL PROBABLY MOLD THE FASTEST?

MARK AN X ON YOUR CHOICE.

Slide 4-28



3. IN WHICH PLACE WOULD MICROBES GROW THE BEST?

MARK AN X ON YOUR CHOICE.

TEACHING STRATEGIES

Have students take turns in selecting a food and explaining to the class these things:

1. What it is.
2. Where it comes from (if possible).
3. How has it been handled up to this point to get it to your room?
4. How does a grocer handle it?
5. How do you handle it when you get it home?
   Do you cook it?
   How do you store it?
6. Does it spoil easily?
7. How expensive is it?
8. Is it needed in a balanced diet?

After completing this discussion reward students with the questions in Part II of this review.

Distribute Worksheet 4-8 and have students put their names on it.

Project each question separately. (Slides 4-26 through 4-28 separately.) Read the choices aloud to the students. Allow ample time for them to mark their worksheets. Repeat this procedure for the next two questions.

After all students have had the opportunity to answer all of the questions, collect the worksheets. Then project each slide and discuss the answers with them. Have them defend their choices. After class tally the students' answers on Tallysheet 4-6. Consider whether the whole class needs further review or if a few individuals need special attention.

Then proceed to the next activity.

TEACHING STRATEGIES

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ass these things:

t it is.
ce it comes from (if possible).
Vhas it been handled up to this point to get it to
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and discuss the answers with them. Have them
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Tallysheet 4-6. Consider whether the whole
further review or if a few individuals need
tention.

d to the next activity.

ANTICIPATED STUDENT BEHAVIORS

Students:

--place an X on "The refrigerator" in question #1.

--place an X on the "Wet and warm" in question #2.

--place an X on the "Sandwich" in question #3.

Teacher ______________________
Date ______________________

UNIT IV, CORE B
TALLYSHEET 4-6: Summary of Student Responses to Worksheet 4-8
Activity 4-16: "Review of Success"

Circle student answers below taken from Worksheet 4-8. In the column for totals write down the number of students who circled each letter.

		1 (milk in ref.)				2 (wet and warm)				3 (unwrapped sandwich)			
	KEY:	[✓ A]	B	C	D	A	[✓ B]	C	D	A	B	C	[✓ D]
Attach ID list here.	01	A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D
		A	B	C	D	A	B	C	D	A	B	C	D

	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	C	D
TOTALS:	___	___	___	___	___	___	___	___	___	___	___	___

Does this review give an accurate indication of student understanding? ☐ Yes ☐ No
If not, what other evidence do you have of student learning?

UNIT IV, CORE B
ACTIVITY 4-16: "Review Of Success"

Teacher

BSCS USE: Post ____ Tally ____ Rev ___

Activity name suggested by class:

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes of preparation each day						
4. Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay. ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay. ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

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11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did any student give away the answer to any question on Worksheet 4-8?
☐ No ☐ Yes: Comment.

18. Concern (or questions) about content:

19. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-16: "Review Of Success"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    d. Recognition of examples of man's impact upon the environment.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

MATERIALS

TEACHING STRATEGIES

Activity 4-17. Compost Microbes

This activity will demonstrate one way in which microbes are similar to other living things. It will reinforce the idea that microbes are living organisms and that decomposition occurs through microbial action. In this case the class compost will be the resource of microbial activity.

OCUS FOR THIS ACTIVITY

OALS:

. Appreciate the cycling relationships of the materials and organisms in the environment through:

   a. Understanding of what a cycle is.

   b. Understanding of the role of decomposers.

   d. Recognition of examples of man's impact upon the environment.

OBJECTIVES:

. Know the habitat requirements of microbes and other decomposers.

. Indicate how knowledge of decomposers can improve man's environment.

. Conclude that microbes contribute to man's well-being as well as pose problems for man.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-17. COMPOST MICROBES

BSCS

TEACHING STRATEGIES

17. Compost Microbes

ty will demonstrate one way in which microbes to other living things. It will reinforce the icrobes are living organisms and that decompo- rs through microbial action. In this case the st will be the resource of microbial activity.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have described a change in something in the compost pile.

--have related the idea of composting to fertilizers and gardening.

--have associated decomposition of dead material with the soil-building process.

--have filled a test tube with indicator solution and labeled that tube.

--have exhaled breath into the indicator solution through a straw.

ACTIVITY 4-17

(98)

MATERIALS

1 Flask (250 ml) wide mouth per pair of students
1 Rubber stopper (#8) one-hole per pair of students
1 Tygon tubing, 5/16" O.D., 12" long per pair of students
1 Test tube, (15 X 150 mm) per student
1 Rubber stopper (#1) no-hole per student
CO_2 test solution (Bromthymol blue)
*Compost from Activity 4-10
*1 Soda straw per student
*1 Wax crayon per pair of students
*Records of changes in class compost
*Water

*Not furnished in materials kit

TEACHING STRATEGIES

Begin this activity by doing your usual observation routine with the class compost pile. Stir the contents with water appropriately and record changes.

Then ask:

> LET'S LOOK AT OUR RECORDS. HAS THE PILE CHANGED SINCE WE STARTED?
>
> HOW HAS IT CHANGED?
>
> HOW HAS THE (an item put in) CHANGED?

Repeat this question for a number of the materials.

INVOLVE Y
SLOWEST
STUDENT

> WHERE ARE THE THINGS GOING THAT ARE BEING DECOMPOSED?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	At the end of this activity, each student should: *--have observed the change in color of the indicator solution.* *--associate the change in indicator solution with carbon dioxide.* *--infer that carbon dioxide is a normal component of exhaled breath.* *--have observed a color change in the indicator solution made by air from the compost.* *--infer that microbes in compost produce carbon dioxide.* *--infer that microbes are living organisms.*
activity by doing your usual observation routine lass compost pile. Stir the contents with water ely and record changes.	Students:
LOOK AT OUR RECORDS. HAS THE PILE ED SINCE WE STARTED?	--respond, "Yes."
AS IT CHANGED?	--respond, "It stinks," "It's rotten."
AS THE (an item put in) CHANGED?	--respond appropriately for each material.
s question for a number of the materials.	
ARE THE THINGS GOING THAT ARE BEING OSED?	--respond, "Into the soil."

INVOLVE YOUR SLOWEST STUDENTS

MATERIALS

TEACHING STRATEGIES

WHAT DOES THIS DO TO THE AMOUNT OF SOIL IN OUR BOX?

DOES ANYONE KNOW ANYBODY WHO HAS A COMPOST PILE IN HIS YARD?

WHY DO PEOPLE BUILD COMPOST PILES?

If no one says yes or that they don't know why compost piles are built, tell them that you know someone who has a compost pile and that compost piles are built to use in gardens.

WHY IS COMPOST ADDED TO GARDENS?

Explain that one of the reasons compost is added to the soil is to enrich the soil and to fertilize the soil in the garden.

WHAT HAPPENS TO A PLANT OR ANIMAL WHEN IT DIES? OR WHAT HAPPENS WHEN A PART OF THE ORGANISM DIES SUCH AS WHEN A LEAF FALLS?

DO THINGS DECOMPOSE ALL BY THEMSELVES?

WHY DO THINGS DECOMPOSE IN OUR COMPOST PILE?

ARE THESE THINGS ALIVE?

DO THEY BREATHE AS WE DO?

LET'S DO AN EXPERIMENT TO FIND OUT.

Set the class compost piles aside for later use in Core C.

St

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TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ES THIS DO TO THE AMOUNT OF SOIL BOX?	--infer it makes more soil.
YONE KNOW ANYBODY WHO HAS A COMPOST HIS YARD?	--respond, "No," "Yes."
PEOPLE BUILD COMPOST PILES?	--respond, "Compost piles are built for gardens."
ys yes or that they don't know why compost ilt, tell them that you know someone who has le and that compost piles are built to use in	
COMPOST ADDED TO GARDENS?	--respond, "Because it acts like fertilizer," "It enriches the soil," "It helps the soil."
one of the reasons compost is added to the nrich the soil and to fertilize the soil in	
PPENS TO A PLANT OR ANIMAL WHEN IT DIES? HAPPENS WHEN A PART OF THE ORGANISM DIES WHEN A LEAF FALLS?	--respond, "It decomposes," "It becomes fertilizer," "It becomes soil."
GS DECOMPOSE ALL BY THEMSELVES?	--respond, "No," "They have to be in a compost pile."
THINGS DECOMPOSE IN OUR COMPOST PILE?	--probably will respond, "Microbes," "Mold."
SE THINGS ALIVE?	--probably will say, "Yes," at this point, but it doesn't matter if they don't.
BREATHE AS WE DO?	--respond, "I don't know."
O AN EXPERIMENT TO FIND OUT.	
s compost piles aside for later use in Core C.	

ACTIVITY 4-17

(100)

MATERIALS

TEACHING STRATEGIES

The success of the rest of this activity depends upon the use of a chemical indicator solution to detect carbon dioxide dissolved in water. An indicator is a substance that shows the presence of a certain chemical substance by changing color. Bromthymol blue is an indicator that changes to a green or yellow color in the presence of an acid. Carbon dioxide (CO_2) forms an acid when dissolved in water. Therefore in this experiment bromthymol blue can be used to indicate, indirectly, the presence of CO_2.

Distribute the materials and direct each student as follows:

Fill a test tube about 1/2 full with water. Using a medicine dropper add 5-10 drops of the indicator solution (bromthymol blue). Explain that the indicator solution will change color (blue to yellow) when there is carbon dioxide present.

Close the end of the test tube with a rubber stopper (no-hole, #1) and mix the contents by shaking.

Insert a soda straw to the bottom of the tube. Blow bubbles into the solution through the straw. Blow the bubbles in an even flow and do not blow too hard or you will blow all of the liquid out of the test tube.

In a few minutes the solution will change in color from blue to yellow, indicating the presence of carbon dioxide produced in human breath.

Explain:

> AS WE BREATHE OUT WE GIVE OFF A GAS CALLED CARBON DIOXIDE. THE CARBON DIOXIDE IN OUR BREATH HAS CHANGED THE COLOR OF THE INDICATOR SOLUTION FROM BLUE TO YELLOW.

TEACHING STRATEGIES

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inutes the solution will change in color from llow, indicating the presence of carbon dioxide n human breath.

BREATHE OUT WE GIVE OFF A GAS CALLED
N DIOXIDE. THE CARBON DIOXIDE IN OUR
H HAS CHANGED THE COLOR OF THE INDICATOR
ION FROM BLUE TO YELLOW.

ANTICIPATED STUDENT BEHAVIORS

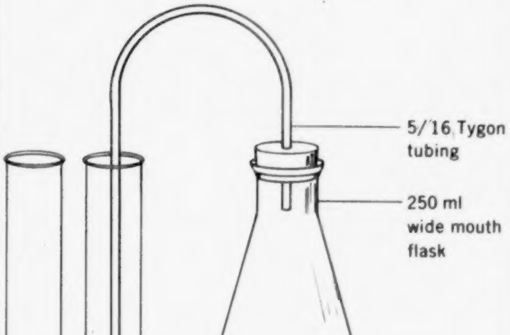
Students:

--blow bubbles for a few minutes through a soda straw.

--observe change in color in indicator solution.

MATERIALS

Diagram 4-6



TEACHING STRATEGIES

Then ask:

HOW COULD WE FIND OUT IF THE MICROBES PRODUCE CARBON DIOXIDE TOO?

Discuss the student suggestions for such an experiment. Point out that the class has equipment to do one sort of experiment.

Assign students to work in pairs and distribute the materials. Direct the students to assemble the equipment and proceed as follows. (See Diagram 4-6.)

Transfer about three heaping tablespoons of compost from the class pile to a wide mouth flask. Stopper the flask. Note that the tubing need only be inserted a short distance into the one-hole stopper. Due to the gripping action of the stopper, it is needless to attempt to insert the tubing more than a few millimeters. Prepare the test tube of indicator solution as the earlier one was prepared.

Place the test tube in something so it will stand up. (Beaker or your homemade test tube racks.) Put the free end of the plastic tube in the bottom of the test tube. The experiment should run for about 24 hours, although a weekend would be more satisfactory.

The normal respiration due to the microbial decomposition of the organic compost should produce plenty of CO_2. As the gas bubbles produced pass through the indicator solution, it will turn from blue to yellow.

At the next class period, ask:

WHAT DID OUR BREATH DO TO THE TEST SOLUTION?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ULD WE FIND OUT IF THE MICROBES PRODUCE DIOXIDE TOO?	--respond, "Do an experiment," "Pour some test solution on the compost pile," "Put some in a test tube indicator solution," etc.
student suggestions for such an experiment. hat the class has equipment to do one sort of	
ents to work in pairs and distribute the Direct the students to assemble the equipment as follows. (See Diagram 4-6.)	--prepare the experiment.
out three heaping tablespoons of compost from ile to a wide mouth flask. Stopper the flask. he tubing need only be inserted a short distance e-hole stopper. Due to the gripping action of , it is needless to attempt to insert the tubing few millimeters. Prepare the test tube of olution as the earlier one was prepared.	
est tube in something so it will stand up. your homemade test tube racks.) Put the the plastic tube in the bottom of the test experiment should run for about 24 hours, weekend would be more satisfactory.	
respiration due to the microbial decomposition nic compost should produce plenty of CO_2. As bles produced pass through the indicator t will turn from blue to yellow.	--observe change of color in indicator solution.
class period, ask:	
ID OUR BREATH DO TO THE TEST SOLUTION?	--recall that it turned yellow.

ACTIVITY 4-17

(102)

MATERIALS

TEACHING STRATEGIES

DO YOU NOTICE ANY CHANGE IN THE SOLUTION IN THE TEST TUBE?

WHAT DOES THIS TELL US?

WHAT DOES THIS TELL US ABOUT THE COMPOST?

DO YOU THINK MICROBES ARE ALIVE?

WHAT ARE ALL THE THINGS WE HAVE NOW LEARNED THAT MICROBES DO THAT MIGHT MAKE YOU THINK THEY ARE ALIVE?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
NOTICE ANY CHANGE IN THE SOLUTION IN ST TUBE?	--respond, "It turned yellow."
OES THIS TELL US?	--respond, "The bubbles are carbon dioxide," "Microbes breathe too."
OES THIS TELL US ABOUT THE COMPOST?	--respond, "The compost makes carbon dioxide," "The microbes produce CO_2."
THINK MICROBES ARE ALIVE?	--respond, "Yes."
RE ALL THE THINGS WE HAVE NOW LEARNED ICROBES DO THAT MIGHT MAKE YOU THINK RE ALIVE?	--respond, "Breathe, grow, stink, die."

UNIT IV, CORE B
ACTIVITY 4-17: "Compost Microbes"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#	slide nos.)	#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did any students have difficulty describing a change in something in the compost pile?
☐ No ☐ Yes: How many? ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ all: Comment.

18. Were there any problems with the indicator solution?
☐ No ☐ Yes: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: **EMH Feedback Form 1c**

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-17: "Compost Microbes"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - b. Understanding of the role of decomposers.
    - d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

MATERIALS

TEACHING STRATEGIES

Activity 4-18. A Real Gas

In this activity students will recognize some of the beneficial aspects of microbes. Part I develops the idea that yeasts are living microbes and introduces, on a practical level, the concept of fermentation. Part II demonstrates another beneficial use of microorganisms by man -- the use of yeast in baking.

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

b. Understanding of the role of decomposers.

d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

Know the habitat requirements of microbes and other decomposers.

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

TEACHING STRATEGIES

8. A Real Gas

vity students will recognize some of the
spects of microbes. Part I develops the
asts are living microbes and introduces, on
level, the concept of fermentation. Part II
another beneficial use of microorganisms
e use of yeast in baking.

UNIT IV.	TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT
CORE B.	DECOMPOSERS IN MY ENVIRONMENT
ACTIVITY 4-18.	A REAL GAS

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have observed the demonstration of wine fermentation.
--have inferred that yeasts are living organisms.
--have recognized the role of yeast in making wine.
--have observed or participated in making bread.
--have recognized the role of yeast in making bread.
--have inferred that some microbes are beneficial to man.

ACTIVITY 4-18

(104)

MATERIALS

1 Flask (250 ml) wide mouth
1 Rubber stopper one-hole, (#8)
1 Piece Tygon tubing (12")
2 Beakers (400 ml)
1 Test tube
*2 Packages of dried yeast
*2 Large bowls
*Frozen grape juice (1 can; nonconcentrated juice has preservatives added to prevent fermentation)
*Table sugar
*Tablespoon measure
*Teaspoon measure
*2 Bread pans
*2 Clean cloths
*1 Sifter
1 Measuring cup
*1/4 lb. Butter
*2 lbs. Flour (sifted all-purpose)

*Not furnished in materials kit

TEACHING STRATEGIES

Part I. Fermenting Grape Juice

WE HAVE BEEN STUDYING MICROBES THAT DECOMPOSE THINGS. LET'S SEE HOW MANY THINGS WE CAN LIST THAT WE HAVE LEARNED ABOUT THESE MICROBES.

As the students describe things they have learned about microbes, develop a list of these items on the chalkboard. Then ask:

ARE THESE MICROBES ALIVE?

HOW DO YOU KNOW THAT THESE MICROBES ARE ALIVE?

WHAT ARE SOME THINGS THESE MICROBES CAN DO?

ARE SOME MICROBES HARMFUL TO US?

ARE THERE ANY USEFUL MICROBES?

TODAY WE ARE GOING TO WORK WITH ANOTHER MICROBE WHICH IS USEFUL.

Hold up a package of yeast and ask:

WHO CAN TELL US WHAT I HAVE HERE?

DOES ANYONE KNOW WHAT YEAST IS?

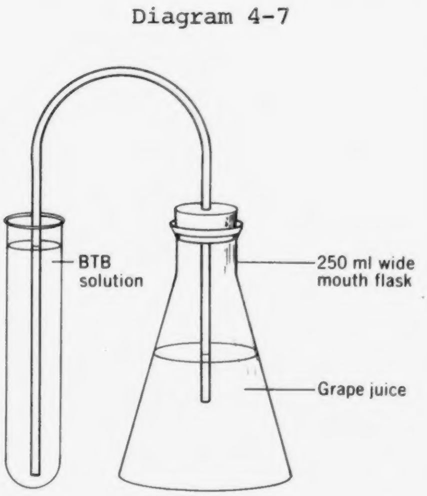
ARE YEAST MICROBES ALIVE?

HOW COULD WE FIND OUT IF YEAST MICROBES ARE ALIVE?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
ermenting Grape Juice	
VE BEEN STUDYING MICROBES THAT DECOMPOSE S. LET'S SEE HOW MANY THINGS WE CAN LIST WE HAVE LEARNED ABOUT THESE MICROBES.	--recall and describe various ideas about microbes.
dents describe things they have learned about develop a list of these items on the chalkboard.	
HESE MICROBES ALIVE?	--respond, "Yes."
O YOU KNOW THAT THESE MICROBES ARE ALIVE?	--cite evidence such as growth, eating things, and smelling.
ARE SOME THINGS THESE MICROBES CAN DO?	--recall, "Cause bread to get moldy," and may suggest, "They cause disease."
OME MICROBES HARMFUL TO US?	--recall Unit II and respond, "Yes."
HERE ANY USEFUL MICROBES?	--recall composting setup and respond, "Yes."
WE ARE GOING TO WORK WITH ANOTHER MICROBE IS USEFUL.	
package of yeast and ask:	
AN TELL US WHAT I HAVE HERE?	--respond, "Yeast."
ANYONE KNOW WHAT YEAST IS?	--respond, "I don't know," "Power," "Something you use to make bread."
EAST MICROBES ALIVE?	--probably respond, "No."
OULD WE FIND OUT IF YEAST MICROBES ARE ALIVE?	--responses will vary; may suggest looking at them, feeding them, seeing if they will grow, putting them in bromthymol blue solution.

MATERIALS

Diagram 4-7



TEACHING STRATEGIES

IF YEAST MICROBES ARE ALIVE, WHAT WOULD THEY HAVE TO DO TO GROW AND STAY ALIVE?

WE ARE GOING TO SEE IF WE CAN FEED OUR YEAST GRAPE JUICE. WHAT DO YOU SUPPOSE WILL HAPPEN IF WE PUT YEAST IN GRAPE JUICE?

Set up the demonstration as shown in Diagram 4-7. Prepare the setup including yeast. Prepare the grape juice according to the directions on the container. Put the remaining grape juice in the refrigerator for tomorrow. Fill the flask about 1/2 full of grape juice, add 1 tablespoon of table sugar and 1/2 teaspoon of dried yeast. Fill the test tube 2/3 full with bromthymol blue. When the apparatus is completely assembled, ask:

WHY DID I CONNECT THE BOTTLE CONTAINING THE YEAST TO THE TEST TUBE?

HOW WILL I KNOW IF YEAST CAN BREATHE?

WE WILL LEAVE THIS SET UP OVERNIGHT AND WILL EXAMINE IT TOMORROW.

OVERNIGHT

WAITING TIME

Ask:

WHAT CHANGE HAS OCCURRED?

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TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
AST MICROBES ARE ALIVE, WHAT WOULD THEY TO DO TO GROW AND STAY ALIVE?	--suggest that they would have to eat.
E GOING TO SEE IF WE CAN FEED OUR YEAST JUICE. WHAT DO YOU SUPPOSE WILL HAPPEN PUT YEAST IN GRAPE JUICE?	--respond, "I don't know," "Make wine."
demonstration as shown in Diagram 4-7. Prepare including yeast. Prepare the grape juice to the directions on the container. Put the grape juice in the refrigerator for tomorrow. lask about 1/2 full of grape juice, add 1 of table sugar and 1/2 teaspoon of dried ll the test tube 2/3 full with bromthymol n the apparatus is completely assembled, ask:	
ID I CONNECT THE BOTTLE CONTAINING THE TO THE TEST TUBE?	--recall previous activity and say, "To see if they breathe."
ILL I KNOW IF YEAST CAN BREATHE?	--recall previous work and predict, "It will turn yellow."
LL LEAVE THIS SET UP OVERNIGHT AND WILL NE IT TOMORROW.	

OVERNIGHT

WAITING TIME

CHANGE HAS OCCURRED?	--respond, "Bromthymol blue has changed to yellow."

ACTIVITY 4-18

(106)

MATERIALS

TEACHING STRATEGIES

WHAT DOES THIS TELL US?

IS THIS EVIDENCE THAT YEAST MICROBES ARE ALIVE?

Review microbes, bromthymol blue, and breathing into the tubes of bromthymol blue if they do not recall.

Pour some of the leftover grape juice from yesterday into a beaker and ask several students to smell it. Then have them smell the fermented grape juice from the setup.

Ask:

DO THEY SMELL THE SAME?

HOW CAN YOU EXPLAIN THE DIFFERENCE IN THE SMELL?

HOW COULD THE YEAST CAUSE THE GRAPE JUICE TO CHANGE?

Discuss all student responses. Finally say:

YEASTS ARE LIVING MICROBES. WHEN YEASTS EAT SOMETHING LIKE GRAPE JUICE THEY GIVE OFF A GAS AND ALCOHOL. MAN USES YEASTS TO MAKE WINE AND BEER. THE SMELL IN THE FLASK WITH THE YEASTS WAS DUE TO ALCOHOL. SOME KINDS OF ALCOHOL ARE POISONOUS, LIKE RUBBING ALCOHOL FOUND IN THE MEDICINE CABINET AT HOME. IT IS DANGEROUS TO DRINK ALCOHOL LIKE THAT WE HAVE PRODUCED SINCE IT MAY BE POISONOUS. PEOPLE WHO MAKE WINE AND BEER ARE VERY CAREFUL NOT TO MAKE THE KIND THAT IS POISONOUS.

DO YOU THINK THAT ALL MICROBES ARE HARMFUL TO MAN?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
DOES THIS TELL US?	--respond, "CO_2 is produced," "Yeast breathes."
IS EVIDENCE THAT YEAST MICROBES ARE ALIVE?	--respond, "Yes."
robes, bromthymol blue, and breathing into the romthymol blue if they do not recall.	
of the leftover grape juice from yesterday into nd ask several students to smell it. Then have the fermented grape juice from the setup.	
EY SMELL THE SAME?	--respond, "No."
AN YOU EXPLAIN THE DIFFERENCE IN THE SMELL?	--recognize and respond that the difference must have been caused by the yeast.
OULD THE YEAST CAUSE THE GRAPE JUICE TO E?	--infer that the change must have been caused by something that the yeast gave off or did.
l student responses. Finally say:	
S ARE LIVING MICROBES. WHEN YEASTS EAT HING LIKE GRAPE JUICE THEY GIVE OFF A ND ALCOHOL. MAN USES YEASTS TO MAKE WINE EER. THE SMELL IN THE FLASK WITH THE S WAS DUE TO ALCOHOL. SOME KINDS OF OL ARE POISONOUS, LIKE RUBBING ALCOHOL IN THE MEDICINE CABINET AT HOME. IT IS ROUS TO DRINK ALCOHOL LIKE THAT WE HAVE CED SINCE IT MAY BE POISONOUS. PEOPLE AKE WINE AND BEER ARE VERY CAREFUL NOT KE THE KIND THAT IS POISONOUS.	
THINK THAT ALL MICROBES ARE HARMFUL ?	--respond, "No." Some students may suggest that yeasts are bad since drinking alcohol may be harmful.

MATERIALS

TEACHING STRATEGIES

Discuss student responses. If students suggest the harmful effects of alcohol and maintain that microbes are bad, ask if they can think of any way that microbes such as yeast may help us. Defer further discussion until the next portion of the activity is completed.

Part II. Making Bread

IT IS ADVISABLE TO S
ACTIVITY EARLY IN

The recipe that is given is extremely simple, anyone can do it! It is fail safe -- you can't miss. If you are particularly nervous about it, you might enlist the aid of the school home economics teacher. Two batches of bread will be made, one with yeast and one without yeast. Students will observe the effects of yeast in making bread, both in the rising and in the baking of the product. If you have a stove at school to bake the two batches of bread, use that. The results will be dramatic. If not, terminate the experiment after the students observe the difference in rising of the four loaves; then take the dough home and bake it. Bring the four loaves the next day.

Begin the lab by asking:

> WHAT WOULD WE NEED IN ORDER TO MAKE A LOAF OF BREAD?

Then say:

> WHY DO YOU SUPPOSE YEAST IS USED IN MAKING BREAD?

> DO YOU THINK IT WOULD MAKE ANY DIFFERENCE IF BREAD WAS MADE WITHOUT YEAST?

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TEACHING STRATEGIES

udent responses. If students suggest the harmful alcohol and maintain that microbes are bad, y can think of any way that microbes such as help us. Defer further discussion until the on of the activity is completed.

Making Bread

IT IS ADVISABLE TO START THIS ACTIVITY EARLY IN THE DAY

that is given is extremely simple, anyone can is fail safe -- you can't miss. If you are ly nervous about it, you might enlist the aid of home economics teacher. Two batches of bread le, one with yeast and one without yeast. ll observe the effects of yeast in making bread, rising and in the baking of the product. If stove at school to bake the two batches of that. The results will be dramatic. If not, he experiment after the students observe the in rising of the four loaves; then take the and bake it. Bring the four loaves the next

ab by asking:

OULD WE NEED IN ORDER TO MAKE A LOAF OF

YOU SUPPOSE YEAST IS USED IN MAKING

THINK IT WOULD MAKE ANY DIFFERENCE IF WAS MADE WITHOUT YEAST?

ANTICIPATED STUDENT BEHAVIORS

Students:

--recall and respond, "Flour," "Salt," "Sugar," and "Yeast."

--respond, "Don't know," "Makes it rise," "To make it taste better."

--respond, "Don't know," "Yes."

MATERIALS

Recipe for 2 loaves of bread:

*1 Pkg. quick acting yeast
*2 Cups lukewarm water
*4 Cups sifted all-purpose flour
*1 Tablespoon sugar
*2 Teaspoons salt
1 Measuring cup
*2 Large bowls
*2 Clean cloths
*1 Sifter
*2 Bread pans
*Shortening to grease pans
*Butter

NOTE: You will need enough ingredients for 4 loaves of bread. You will use no yeast in 2 of the loaves.

*Not furnished in materials kit

TEACHING STRATEGIES

HOW COULD WE FIND OUT?

IF WE MADE SOME BREAD WITH YEAST AND SOME WITHOUT YEAST, WHAT WOULD YOU PREDICT WOULD BE DIFFERENT?

LET'S MAKE FOUR LOAVES OF BREAD, TWO WITH YEAST AND TWO WITHOUT, AND SEE WHAT HAPPENS.

This could be done as a demonstration or by groups of students. Copy the recipe on the chalkboard or ditto it for students to follow. Follow the recipe below. Repeat the same procedure for the two loaves of unleavened bread, except do not add yeast. You, therefore, need not set the dough aside to rise.

Have the students help you demonstrate as much as possible if you do it as a demonstration.

Bread Recipe

Dissolve yeast in 1 cup of water (lukewarm). While the yeast softens, sift the flour, sugar, and salt together in the large bowl, then stir in the dissolved yeast. Add enough of the second cup of water to hold the dough together. Mix until you have a soft, rather sticky dough. Cover the dough with a moist clean cloth, and let rise until it doubles in size (2-4 hours).

Punch the raised dough down with your fist and give it a good beating. Don't knock all the air bubbles out. Place the dough in a greased 9" X 5" X 3" loaf baking pan. Cover and let the dough rise until it reaches the top of the pan or doubles in size. Then bake at 400° for one hour. If crust begins to burn or gets too brown, cover with aluminum foil. Brush the top with melted butter.

TEACHING STRATEGIES

LD WE FIND OUT?

ADE SOME BREAD WITH YEAST AND SOME
YEAST, WHAT WOULD YOU PREDICT WOULD
ERENT?

AKE FOUR LOAVES OF BREAD, TWO WITH
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a greased 9" X 5" X 3" loaf baking pan. Cover
dough rise until it reaches the top of the pan
n size. Then bake at 400° for one hour. If
to burn or gets too brown, cover with aluminum
the top with melted butter.

ANTICIPATED STUDENT BEHAVIORS

Students:

--suggest making bread with and without yeast.

--predictions will probably vary considerably.

MATERIALS

TEACHING STRATEGIES

The difference between the two sets of loaves should be dramatic. The difference will be apparent both before and after baking.

Ask:

> WHAT DIFFERENCE DO YOU SEE IN THE TWO SETS OF LOAVES OF BREAD?
>
> WHAT DO YOU THINK CAUSED THIS DIFFERENCE?
>
> THINK ABOUT WHAT HAPPENED WHEN WE PUT YEAST IN THE GRAPE JUICE. CAN YOU EXPLAIN WHY ONE LOAF OF BREAD GOT LARGER?

Review grape juice experience if necessary to elicit desired response.

> DO YOU THINK THE TWO LOAVES WILL TASTE ANY DIFFERENT?

Allow students to taste each of the loaves.

Then ask:

> WHICH KIND OF BREAD WOULD YOU RATHER HAVE IN A SANDWICH?
>
> WHY?
>
> HOW COULD YEAST MAKE THE BREAD TASTE DIFFERENT?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
e between the two sets of loaves should be e difference will be apparent both before and	
FERENCE DO YOU SEE IN THE TWO SETS OF F BREAD?	--respond that the loaf without the yeast is smaller and flatter.
YOU THINK CAUSED THIS DIFFERENCE?	--recognize that the yeast must have caused the difference since it was the only difference in the two treatments.
BOUT WHAT HAPPENED WHEN WE PUT YEAST IN E JUICE. CAN YOU EXPLAIN WHY ONE LOAF GOT LARGER?	--suggest that the yeast must have caused the bread to rise.
juice experience if necessary to elicit nse.	
HINK THE TWO LOAVES WILL TASTE ANY T?	--respond, "Yes," "No," "Maybe."
s to taste each of the loaves.	
ND OF BREAD WOULD YOU RATHER HAVE IN CH?	--respond, "The one with the yeast."
	--respond, "It tastes better," "Not so hard."
D YEAST MAKE THE BREAD TASTE DIFFERENT?	--suggest that something must be given off by the yeast that makes the bread taste better.

ACTIVITY 4-18

(110)

MATERIALS

TEACHING STRATEGIES

ARE ALL MICROBES BAD FOR US?

WE HAVE SEEN THAT YEASTS MAY BE HELPFUL MICROBES. THERE ARE LOTS OF OTHER HELPFUL MICROBES. SOME ARE USED TO MAKE CHEESE, OTHERS HELP MAKE SAUERKRAUT, AND OTHERS ARE USED TO MAKE MEDICINES WHICH HELP US GET WELL WHEN WE ARE SICK. SCIENTISTS TELL US THAT THERE ARE MANY MORE MICROBES THAT HELP US THAN THERE ARE MICROBES THAT ARE HARMFUL TO US.

S

-

TEACHING STRATEGIES

CROBES BAD FOR US?

EN THAT YEASTS MAY BE HELPFUL MICROBES.
LOTS OF OTHER HELPFUL MICROBES. SOME
MAKE CHEESE, OTHERS HELP MAKE
, AND OTHERS ARE USED TO MAKE MEDICINES
US GET WELL WHEN WE ARE SICK.
TELL US THAT THERE ARE MANY MORE
HAT HELP US THAN THERE ARE MICROBES
RMFUL TO US.

ANTICIPATED STUDENT BEHAVIORS

Students:

--respond, "No."

UNIT IV, CORE B
ACTIVITY 4-18: "A Real Gas"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
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13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

---

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Were any students unable to help prepare the bread?
☐ No ☐ Yes: Comment.

18. Were there any negative parent reactions to making wine in school?
☐ No ☐ Yes: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: **EMH Feedback Form 1c**

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-18: "A Real Gas"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    c. Realization that certain materials are in finite supply.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE B OBJECTIVES:

1. Know the habitat requirements of microbes and other decomposers.
2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

UNIT

CORE

ACTI

MATERIALS

TEACHING STRATEGIES

Activity 4-19. Completing The Run Around

This activity is most critical in Core B because it introduces the concept of a cycle and answers some of the questions posed earlier in the core. It is difficult for students to appreciate the very complex idea of the cyclic nature of the living world. This activity will merely serve as an introduction to this idea.

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--be
--hav

US FOR THIS ACTIVITY

LS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

- a. Understanding of what a cycle is.
- b. Understanding of the role of decomposers.
- c. Realization that certain materials are in finite supply.
- d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part of nature, not apart from nature.

JECTIVES:

Know the habitat requirements of microbes and other decomposers.

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

UNIT IV.	TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT
CORE B.	DECOMPOSERS IN MY ENVIRONMENT
ACTIVITY 4-19.	COMPLETING THE RUN AROUND

BSCS

TEACHING STRATEGIES

Completing The Run Around

is most critical in Core B because it intro-
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d earlier in the core. It is difficult for
ppreciate the very complex idea of the cyclic
living world. This activity will merely
troduction to this idea.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--be able to define the word cycle.
--be able to cite several examples of cycles.
--have made a representation of a natural cycle.

ACTIVITY 4-19

MATERIALS

Deck of flash cards
Booklet, *The Long Journey*
*Large piece of butcher paper, one per student
*Many magazines with pictures
*Tape or glue
*Felt pens

*Not furnished in materials kit

TEACHING STRATEGIES

Begin by placing on the chalk tray the flash cards arranged in the food chain you used with your students at the beginning of Activity 4-9. For example:

HAWK → FROG → MOSQUITO → MAN → COW → GRASS

Then ask:

WHAT HAVE I SHOWN AT THE BOARD?

I ASKED YOU A QUESTION A LONG TIME AGO THAT WE COULDN'T ANSWER VERY WELL: WHAT EATS A HAWK?

Students will probably have difficulty with this question even at this point. Repeat the questions used earlier in Activity 4-9 and remind them of the slides in Activity 4-9 and the activities 4-10 through 4-17. Ask things such as:

DO HAWKS LIVE FOREVER?

WHAT HAPPENS TO DEAD HAWKS? ANIMALS?

WHY AREN'T ANIMALS PILING UP OUTSIDE?

When students have identified and recalled the role of decomposers from their experience, complete the cycle on the chalkboard as follows:

HAWK → FROG → ETC.
↖ DECOMPOSERS

Then ask:

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
acing on the chalk tray the flash cards arranged chain you used with your students at the begin- ivity 4-9. For example: → FROG → MOSQUITO → MAN → COW → GRASS	
AVE I SHOWN AT THE BOARD?	--recall previous work and say, "Food chain."
D YOU A QUESTION A LONG TIME AGO THAT WE 'T ANSWER VERY WELL: WHAT EATS A HAWK?	--recall previous experiences and respond, "Decomposers."
ll probably have difficulty with this question s point. Repeat the questions used earlier in 9 and remind them of the slides in Activity 4-9 ivities 4-10 through 4-17. Ask things such as:	
KS LIVE FOREVER?	--recall previous experiences and answer appropriately.
APPENS TO DEAD HAWKS? ANIMALS?	--respond, "They rot," "Decompose."
EN'T ANIMALS PILING UP OUTSIDE?	--respond, "They get eaten up!"
ts have identified and recalled the role of from their experience, complete the cycle on ard as follows: →FROG→ETC. COMPOSERS	

MATERIALS

TEACHING STRATEGIES

WHAT HAPPENS TO THE HAWK AFTER DECOMPOSERS EAT IT?

WHAT EATS DECOMPOSERS?

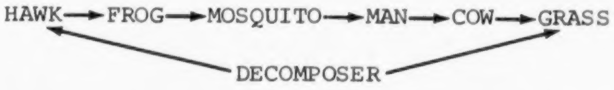
WHAT HAPPENS TO DEAD MICROBES?

If students have difficulty with this question review the discussion held earlier on the class compost pile. Probe and review until students tell you that decomposed things are put back into the soil.

Then ask:

WHAT LIVING THINGS NEED SOIL TO GROW?

Now complete the cycle on the chalkboard as follows:



This diagram should raise some questions in your students' minds. You must explain very carefully what you have now made. Ask:

WHAT IS THE SOIL MADE FROM?

Again talk through the cycle and ask:

DOES THIS MEAN GRASS EATS DECOMPOSERS?

Now return to your definition of decomposer as one that breaks other things into small pieces. In this case the decomposers are breaking the dead hawk down into pieces

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
PENS TO THE HAWK AFTER DECOMPOSERS EAT	--respond, "Goes into the soil."
S DECOMPOSERS?	--respond, "Other decomposers, like microbes."
PENS TO DEAD MICROBES?	--respond, "Microbes are so tiny they don't need anything to decompose them. They go right into the soil."
ave difficulty with this question review n held earlier on the class compost pile. iew until students tell you that decomposed t back into the soil.	
ING THINGS NEED SOIL TO GROW?	--respond, "Plants."
the cycle on the chalkboard as follows: ROG→MOSQUITO→MAN→COW→GRASS DECOMPOSER	
should raise some questions in your students' ust explain very carefully what you have now	
THE SOIL MADE FROM?	--respond, "Little pieces of rocks and pieces of once-living things that have been decomposed."
rough the cycle and ask:	
S MEAN GRASS EATS DECOMPOSERS?	--respond, "It looks that way."
your definition of decomposer as one that things into small pieces. In this case the re breaking the dead hawk down into pieces	

MATERIALS

TEACHING STRATEGIES

and returning the pieces into the soil. After this wild idea, ask:

DOES THIS MEAN THAT GRASS TAKES A PIECE OF HAWK OUT OF THE SOIL?

You must help students a great deal at this point and explain to them that materials are cycled through nature and that a "piece" of animal may very well end up in a plant. Of course the "pieces" we are talking about are atoms and molecules and therefore not visible.

Introduce the word "cycle" to your students now by directing their attention to the one on the chalkboard. Say:

NOTICE HOW THESE ARROWS GO AROUND IN A CIRCLE?

Write the word "cycle" on the chalkboard.

SCIENTISTS USE THE WORD "CYCLE" FOR THINGS THAT GO AROUND IN CIRCLES.

HOW DO YOU USE THE WORD CYCLE?

WHAT IS GOING AROUND IN CIRCLES IN A MOTORCYCLE?

Explain that bicycle, tricycle, etc., do stem from the word "cycle" and circles.

The idea of cycles may not be an easy one for your students. Be patient and give them assistance.

Continue now by returning to the booklet, *The Long Journey*. Read through the booklet again, quickly reviewing the story with your students. Then say:

Stu

--w

--r

--r

TEACHING STRATEGIES

ing the pieces into the soil. After this wild

THIS MEAN THAT GRASS TAKES A PIECE OF
OUT OF THE SOIL?

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D YOU USE THE WORD CYCLE?

IS GOING AROUND IN CIRCLES IN A MOTORCYCLE?

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e" and circles.

f cycles may not be an easy one for your students.
and give them assistance.

ow by returning to the booklet, *The Long*
Read through the booklet again, quickly reviewing
with your students. Then say:

ANTICIPATED STUDENT BEHAVIORS

Students:

--will be confused at this point.

--respond, "Motorcycle."

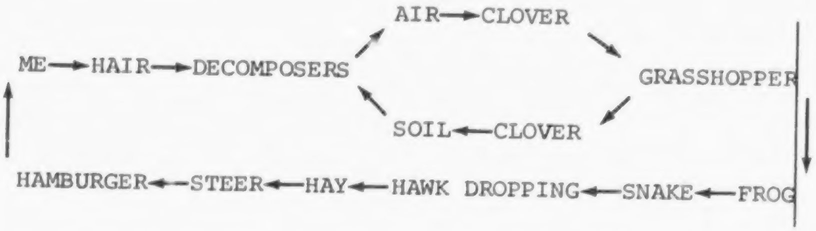
--respond, "The wheels."

MATERIALS

TEACHING STRATEGIES

IN THE STORY WE SAW WHERE PART OF OUR HAIR CAME FROM. WHAT WOULD HAPPEN TO YOUR HAIR IF IT WAS CUT OFF AND THROWN OUTSIDE?

Now help your students trace their cut-off hair through *The Long Journey* back to themselves as shown:


ME
HAIR
DECOMPOSERS
AIR
CLOVER
GRASSHOPPER
CLOVER
SOIL
FROG
SNAKE
HAWK DROPPING
HAY
STEER
HAMBURGER

WHAT DO WE HAVE DRAWN ON THE CHALKBOARD?

If they do not say this, ask:

DO THINGS GO AROUND IN A CIRCLE?

WHAT DO WE CALL THINGS THAT GO AROUND IN A CIRCLE?

COULD YOUR "PIECES" OF HAIR GO TO SOME OTHER PERSON?

If students answer "No," ask:

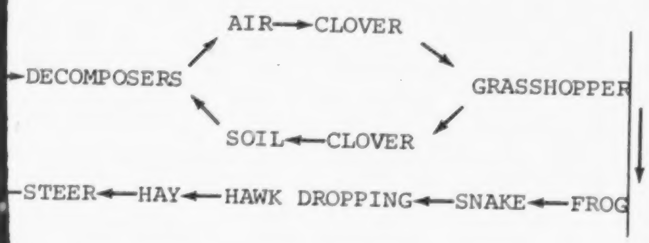
COULD SOMEONE ELSE EAT THE HAMBURGER?

COULD THEY THEN GET YOUR HAIR PIECES?

Then ask:

WHAT IS A CYCLE?

WHAT LIVING THINGS SEEM TO HELP MAKE CYCLES OUT OF FOOD CHAINS?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
STORY WE SAW WHERE PART OF OUR HAIR CAME WHAT WOULD HAPPEN TO YOUR HAIR IF IT WAS AND THROWN OUTSIDE?	--respond, "Blow away," "Decompose."
students trace their cut-off hair through *ney* back to themselves as shown:  AIR CLOVER DECOMPOSERS GRASSHOPPER SOIL CLOVER STEER HAY HAWK DROPPING SNAKE FROG	
WE HAVE DRAWN ON THE CHALKBOARD?	--respond, "A cycle."
they do not say this, ask:	
THINGS GO AROUND IN A CIRCLE?	--respond, "Yes."
T DO WE CALL THINGS THAT GO AROUND A CIRCLE?	--respond, "A cycle."
UR "PIECES" OF HAIR GO TO SOME OTHER	--infer, "Yes."
students answer "No," ask:	
LD SOMEONE ELSE EAT THE HAMBURGER?	--respond, "Yes."
LD THEY THEN GET YOUR HAIR PIECES?	--infer, "Yes."
A CYCLE?	--respond, "Something that goes in circles."
NG THINGS SEEM TO HELP MAKE CYCLES OUT HAINS?	--respond, "Decomposers."

ACTIVITY 4-19

MATERIALS

TEACHING STRATEGIES

WHAT DO DECOMPOSERS DO THAT MAKES THEM SO IMPORTANT IN CYCLES?

Now direct students to make an example of a cycle. Give them a piece of butcher paper, tape, and many magazines and see if they can picture a cycle. Have them connect their pictures with arrows drawn with the felt pens. They undoubtedly will have to write in the word "Decomposers" in their cycle because they will probably not find pictures of them or will not recognize them if they did. Assist them in this task but do not tell them what to do. When each student has finished his cycle have him display it and explain it to the class. Allow the class to criticize the cycle and find errors. As errors are identified, have students correct them with their felt pens.

This activity will be a good gauge to tell you whether your students understand food chains as well as a cycle. If most students have made a good cycle, continue with the next activity. Give extra help to those who did not comprehend the ideas before going on.

TEACHING STRATEGIES

DO DECOMPOSERS DO THAT MAKES THEM SO
TANT IN CYCLES?

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ty. Give extra help to those who did not
the ideas before going on.

ANTICIPATED STUDENT BEHAVIORS

Students:

--recall previous work and respond, "Break things down."

UNIT IV, CORE B
ACTIVITY 4-19: "Completing The Run Around"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described- ☐ Worthless --drop it

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

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	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
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SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did each student make an example of a cycle?
☐ Yes ☐ No: Who?

18. Was the second reading of *The Long Journey* helpful?
☐ Yes ☐ No: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

ave you answered each question, attached annotated Guide, your revisions, student work, etc.?

IDE A

UNIT IV, CORE B
ACTIVITY 4-19: "Completing The Run Around"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - a. Understanding of what a cycle is.
    - b. Understanding of the role of decomposers.
    - d. Recognition of examples of man's impact upon the environment.

CORE B OBJECTIVES:

2. Indicate how knowledge of decomposers can improve man's environment.
3. Conclude that microbes contribute to man's well-being as well as pose problems for man.

MATERIALS

*35mm Slide projector
Worksheet 4-9
Slides 4-29 through 4-32

*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-20. Review Of Success

This review of success consists of four multiple choice questions. Use the questions to assess the success of your students since the last review.

Distribute Worksheet 4-9 and have each student put his name on it.

Project each question separately. Read the question and choices aloud to the students. Allow ample time for them to mark their worksheets. Repeat this procedure for the next three questions.

After all students have had the opportunity to answer all of the questions, collect the worksheets. Then project

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

a. Understanding of what a cycle is.

b. Understanding of the role of decomposers.

d. Recognition of examples of man's impact upon the environment.

BJECTIVES:

Indicate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

TEACHING STRATEGIES

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UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN MY ENVIRONMENT

ACTIVITY 4-20. REVIEW OF SUCCESS

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

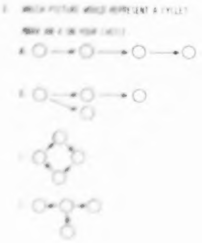
--have answered the four questions on his worksheet.

ACTIVITY 4-20

MATERIALS

Worksheet 4-9

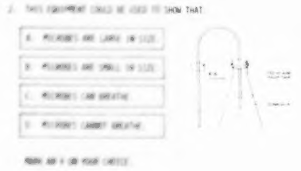
Slide 4-29



1. WHICH PICTURE WOULD REPRESENT A CYCLE?

MARK AN X ON YOUR CHOICE.

Slide 4-30



2. THIS EQUIPMENT COULD BE USED TO SHOW THAT

A. MICROBES ARE LARGE IN SIZE.

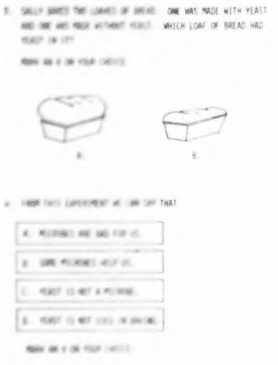
B. MICROBES ARE SMALL IN SIZE.

C. MICROBES CAN BREATHE.

D. MICROBES CANNOT BREATHE.

MARK AN X ON YOUR CHOICE.

Slide 4-31



3. SALLY BAKED TWO LOAVES OF BREAD. ONE WAS MADE WITH YEAST AND ONE WAS MADE WITHOUT YEAST. WHICH LOAF OF BREAD HAD YEAST IN IT?

MARK AN X ON YOUR CHOICE.

4. FROM THIS EXPERIMENT WE CAN SAY THAT

A. MICROBES ARE BAD FOR US.

B. SOME MICROBES HELP US.

C. YEAST IS NOT A MICROBE.

D. YEAST IS NOT USED IN BAKING.

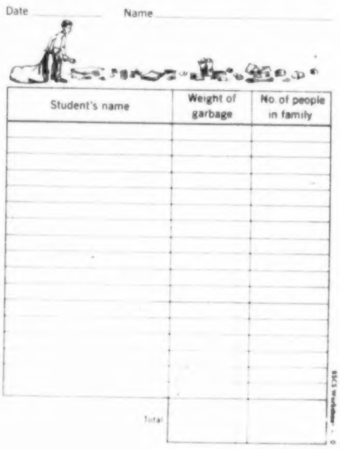
MARK AN X ON YOUR CHOICE.

TEACHING STRATEGIES

each slide and discuss the answers with them. Have them defend their choices. After class tally the students' answers on Tallysheet 4-7. Consider whether the whole class needs further review or if a few individuals need special attention.

Then proceed to the next core.

Slide 4-32



Date ________ Name ________

Student's name	Weight of garbage	No. of people in family
Total		

TEACHING STRATEGIES

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to the next core.

de 4-32

	Weight of garbage	No of people in family

ANTICIPATED STUDENT BEHAVIORS

Teacher ____________________
Date ____________________

UNIT IV, CORE B
TALLYSHEET 4-7: Summary of Worksheet 4-9
Activity 4-20: "Review Of Success"

Circle each student's answers to Worksheet 4-9 on the tallysheet below. In the columns for totals, write down the number of students who circled each letter.

	1 (Cycle)				2 (BTB)				3 (Bread)		4 (Purpose)			
KEY:	A	B	[✓ C]	D	A	B	[✓ C]	D	[✓ A]	B	A	[✓ B]	C	D
01	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D

	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
	A	B	C	D	A	B	C	D	A	B	A	B	C	D
TOTALS:	___	___	___	___	___	___	___	___	___	___	___	___	___	___

Does this review give an accurate indication of student understanding? ☐ Yes ☐ No
If not, what other evidence do you have of student learning?

UNIT IV, CORE B

ACTIVITY 4-20: "Review Of Success"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did any student give away the answer to any question on Worksheet 4-9?
☐ No ☐ Yes: Comment.

18. Concern (or questions) about content:

19. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE B
ACTIVITY 4-20: "Review Of Success"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

- ☐ how you organized materials or class.
- ☐ things added (a question, a picture, etc.).
- ☐ equipment, supplies, visual aids.
- ☐ things that went wrong, misunderstandings.
- ☐ what you would do differently or avoid next time.

THE STUDENTS

- ☐ who had problems and what they were.
- ☐ how someone "caught on" (or who never did).
- ☐ who was really "turned off" (or on).
- ☐ reactions of parents, teachers, students.
- ☐ special evidence of learning or applying ideas.

- ☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

UNIT IV
REACTIONS TO CORE B

1. Was the background information for this core adequate? ☐ Yes ☐ No
Comment:

2. Was it clear to you why these particular activities were chosen and the direction they were leading? ☐ Yes ☐ No
Comment:

3. Did the activities fulfill the purposes stated in the Guide for this core? ☐ Yes ☐ No
Comment:

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities? ☐ Yes ☐ No
6. If yes, what do you see as the "take-home" lesson? If no, what is needed?

7. In these materials, what things did your students find difficult to do?

8. Should there be more clues to success or reviews of success in this core? ☐ Yes ☐ No
Comment:

9. Was there too much reading and too many teacher directions? ☐ Yes ☐ No
Comment:

10. Did you make use of the Planning Guide? ☐ Yes ☐ No
Comment:

BSCS Evaluation: EMH Feedback Form 2a

5. Is there a practical (take-home) value for your students in these activities? ☐ Yes ☐ No
6. If yes, what do you see as the "take-home" lesson? If no, what is needed?

7. In these materials, what things did your students find difficult to do?

8. Should there be more clues to success or reviews of success in this core? ☐ Yes ☐ No
Comment:

9. Was there too much reading and too many teacher directions? ☐ Yes ☐ No
Comment:

10. Did you make use of the Planning Guide? ☐ Yes ☐ No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

12. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain.

SIDE A

NEW STUDENTS ENTERING DURING THIS CORE

Date Entered	Last Name Name Used	Ethnic Group	Sex	Birthdate	Test date	Test	Total
		W B S O	M F			W B O	
		W B S O	M F			W B O	
		W B S O	M F			W B O	
		W B S O	M F			W B O	

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name First

W = wnite
B = black
S = Spanish-American
O = other

W = WISC
B = Binet
O = other (name)

ADDITIONAL INFORMATION ON NEW STUDENTS:

NEW STUDENTS ENTERING DURING THIS CORE

roup	Sex	Birthdate	Test date	Test	Total	Verbal	Performance	Previous Test Score
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				

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W = WISC
B = Binet
O = other
(name)

SIDE B

Me and my Environment

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMEN

CORE C. GARBAGE AND MY ENVIRONMENT

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

UNIT

1. Appreciate the cycling relationships through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of deco
   c. Realization that certain material
   d. Recognition of examples of man's
2. Comprehend the role of man as an inte

OBJECTIV

1. Perceive that garbage (solid waste) i
   a. Understanding of the concept of b
   b. Realization that satisfactory sol
   c. Description of daily garbage.
2. Accept the need for recycling materia
   a. Recognition that certain material
   b. Identification of uses for variou
   c. Accomplishment of a recycling tas
3. Exhibit a positive attitude toward mi

IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

C. GARBAGE AND MY ENVIRONMENT

BSCS

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UNIT IV GOALS

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.
   c. Realization that certain materials are in finite supply.
   d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES OF CORE C

1. Perceive that garbage (solid waste) is a man-made problem through his:
   a. Understanding of the concept of biodegradable and nonbiodegradable.
   b. Realization that satisfactory solid waste disposal is difficult.
   c. Description of daily garbage.
2. Accept the need for recycling materials through his:
   a. Recognition that certain materials are in finite supply.
   b. Identification of uses for various components of solid waste.
   c. Accomplishment of a recycling task.
3. Exhibit a positive attitude toward microbes that decompose garbage.

Me and my Environment

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIR

CORE C. GARBAGE AND MY ENVIRONMENT

CORE C RATIONALE

Attention is now focused on what the layman often considers to be the terminus of energy and material chains and cycles -- garbage. In a practical and short-term sense, this is true for such discards as glass, metal, and plastics in whose compounds the energy and atoms of matter are locked as permanently as they are in the bedrock. To perceive the problem created by man's use and disposal of materials, as well as to realize the necessity for quickly returning the materials to natural or man-made cycles, a study of garbage is germane.

Once there is an acknowledgment that a problem exists, a solution or accommodation to it can be tackled. It is in this final core of the unit that the student can be given the background and practical knowledge to exert some control over his immediate environment and to modify his behavior to alleviate rather than aggravate the problem. It is here, then, that the concepts of biodegradable, recycling, and composting can be used as a potential basis for behavior modification.

BACKG

Activity 4-21 an
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Inquiry is then direc

The film *Garbage*
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Groundwork for re
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T IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

E C. GARBAGE AND MY ENVIRONMENT

BSCS

often considers to
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BACKGROUND INFORMATION FOR THE TEACHER

Activity 4-21 and 4-22 involve weighing and sorting one day's accumulation of garbage by each student and using this data to suggest what a daily accumulation for the city might be. You will need to find out the population of your city. A note sent home to the parent asking cooperation for the home collection is recommended. A worksheet is included to expedite the collection of the data. In separating trash into categories, students will probably find that paper is the largest single component. Inquiry is then directed towards recycling some of these materials.

The film *Garbage* serves as the basis for Activity 4-23. IT IS ESSENTIAL THAT THIS BE ORDERED WELL IN ADVANCE AND THAT IT BE USED IN THE PROPER SEQUENCE OF ACTIVITIES. It is designed to have impact and presents the problem of trash with a depth seldom thought of. In a trip to a trash collection or disposal center, Activity 4-24 serves as a natural follow-up. It does require added planning on the part of the teacher, but the results should indicate that the time was well spent.

Groundwork for recycling has been laid. The *Recycling Payoff* game, Activity 4-25, is arbitrarily designed so that the person who recycles during the game wins. However true this may be someday in the real sense, fortunately we have not yet reached the crisis state of affairs where there is no alternative but to recycle at any cost.

Activity 4-26 is a completion of previous activities in the sense that the biodegradable elements of the compost are humus, or very close to it, and will be put to a practical use as a planting medium. The nonbiodegradable materials will have decomposed. A review of terms and components of the compost is included in the activity, along with a time chart to be constructed on the chalkboard. If there is not enough compost to fill up each peat pot, use some soil, pointing out to the students that mixing soil with compost is the way compost is usually used in gardening. The three plants used here were selected for the following reasons that you may decide to use for discussion: Marigolds

BACKGROUND I

are generally relatively
either as plants or seed
plants for the garden, a
juices which repel some
unique ornamentals; the
fully expand and recover
are legume and will help
should be familiar to ma
will produce a seed that
enhance germination to s

Two activities, 4-2
in the more traditional
these are very practical
can demonstrate his unde

A final review of s
tional assessment prior

BACKGROUND INFORMATION FOR THE TEACHER (continued)

are generally relatively easy to germinate and grow, easy to obtain either as plants or seeds if the student wants more, excellent border plants for the garden, and natural insecticides, i.e., they have natural juices which repel some insects; Sensitive plants are interesting and unique ornamentals; the leaves will fold up at the slightest touch, to fully expand and recover in fifteen to twenty minutes. The bean plants are legume and will help restore nitrogen to the soil; the fruit, a pod, should be familiar to many students, and if taken care of properly, will produce a seed that can be planted again. It will probably enhance germination to soak all the seeds overnight before planting.

Two activities, 4-27 and 4-28, provide the opportunity for recycling in the more traditional and concrete sense. Spend time on them, since these are very practical ways in which the student can become involved and can demonstrate his understanding.

A final review of success, Activity 4-29, can serve as an instructional assessment prior to the start of the next unit.

Me and my Environment

UNIT IV
CORE C

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ☛ *in the m*
be prepared several days or weeks in advance. Use this
a teaching and preparation schedule. All supplies neede

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics and*
4-21. Garbage Weighers Page _____ Date planned _____	Bags of garbage		*One bag per stu* *the Teacher P* *prepare the s* *activity. Tw* *students of t*
	Bag of garbage		*You must also c* *in the activi* *that may have*
	String		One ball (stron
	Plastic garbage bags or recycled plastic bags		*One per student.* *have students* *used in thi*
	Plastic or rubber gloves		*One pair per stu*
		Spring balance	One per class
		Worksheet 4-10	Garbage Amounts
		Slide 4-32	Worksheet 4-10
4-22. Garbage Probe Page _____ Date planned _____	Plastic or rubber gloves		*One pair per stu*
	Newspaper		Large quantity t
	Spoons		Several per clas
	Pails or plastic ice cream buckets		*Six per class*
		Spring balance	One per class
	Compost		Started and used
	Packages with the term biodegradable on them		*Hunt for these s* *Activity 4-22.*
		Worksheet 4-4	Previously fille

PLANNING GUIDE

e activities (*indicated in italics and an* ➘ *in the margin*) must prepared several days or weeks in advance. Use this summary as eaching and preparation schedule. All supplies needed are listed.

BSCS

t of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
sh	Materials in Supply Kit	
		One bag per student. Note the preplanning directions given in the Teacher Preparation *section of Activity 4-21. You must prepare the students for the activity one week before the activity. Two days before the activity you must remind students of their responsibility.* ➘
		You must also contribute one bag of garbage and be a participant in the activity. Your bag can also be used by any students that may have forgotten their own.
		One ball (strong enough to suspend a 25 lb. weight)
r s		*One per student. Ideally about two weeks before the activity have students start collecting large plastic bags to be used in this activity.* ➘
es		*One pair per student. Get a variety of sizes.*
	Spring balance	One per class
	Worksheet 4-10	Garbage Amounts
	Slide 4-32	Worksheet 4-10
es		*One pair per student. Get a variety of sizes.*
		Large quantity to spread out around the room.
		Several per class
ream		
		Six per class
	Spring balance	One per class
		Started and used in Core B of Unit IV
m		*Hunt for these several days in advance of your discussion in Activity 4-22.* ➘
	Worksheet 4-4	Previously filled in by students in Core B

Me and my Environment

UNIT IV
CORE C

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ➘ *in the* be prepared several days or weeks in advance. Use this a teaching and preparation schedule. All supplies need

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics a*
4-23. Garbage Page _____ ➘ Date planned _____	16mm Movie sound projector Screen Film, *Garbage* Media Department Holt, Rinehart and Winston, Inc. 383 Madison Avenue New York, New York 10017		➘ *Order this fil months in ad time. It ca $135.00. Nu*
➘ 4-24. It's A Real Dump Page _____ Date planned _____			➘ *Read carefully for the deta and arrangem*
4-25. The Recycling Pay Off Page _____ Date planned _____		Game: *The Recycling Pay Off*	One game set p

PLANNING GUIDE

ome activities (*indicated in italics and an* ➘ *in the margin*) must
e prepared several days or weeks in advance. Use this summary as
teaching and preparation schedule. All supplies needed are listed.

BSCS

ist of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
nish	Materials in Supply Kit	
jector		
10017		➘ *Order this film, produced by King Screen Productions, several months in advance to guarantee you have it at the appropriate time. It can be rented for about $15.00 or purchased for $135.00. Numerous other film libraries also have the film.*
		➘ *Read carefully the Teacher Preparation section of this activity for the details of the trip you must plan. Make the contacts and arrangements outlined at least one week in advance.*
	Game: *The Recycling Pay Off*	One game set per four or five students

Me and my Environment

UNIT IV
CORE C

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ✔ *in the*
be prepared several days or weeks in advance. Use this
a teaching and preparation schedule. All supplies need

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics an*
4-26. Planting In Compost Page _____ Date planned _____	Compost piles		Class compost p
	Cleaned 1/2 pint milk cartons		*Fifty per class*
	Popsicle sticks or masking tape		Fifty sticks pe used as an al situation.
	Marking pencils		Several for cla
	Trowels		Several for cla
		Peat pots	Fifty per class
		Seeds: Sensitive plant Marigold Bean	One package per
4-27. A Recycling Scavenger Hunt Or Clean Up Page _____ Date planned _____	Man Power - Student Power!		*Make any commun outlined.*

PLANNING GUIDE

BSCS

e activities (*indicated in italics and an* ⬋ *in the margin*) must
prepared several days or weeks in advance. Use this summary as
eaching and preparation schedule. All supplies needed are listed.

t of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
sh	Materials in Supply Kit	
		Class compost piles from Core B.
king		*Fifty per class. Collect these from your school cafeteria.*
		Fifty sticks per class for labeling pots. Masking tape could be used as an alternate but the sticks are more like a garden situation.
		Several for class use
		Several for class use
	Peat pots	Fifty per class
	Seeds:	
	Sensitive plant	
	Marigold	
	Bean	One package per class
ver!		*Make any community contacts needed to expedite the activities outlined.* ⬋

Me and my Environment

UNIT IV
CORE C

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an* ☛ *in th*
be prepared several days or weeks in advance. Use th
a teaching and preparation schedule. All supplies ne

Activity Number, Page, Tentative Teaching Date	Check List of Supplies Needed		
	Materials You Furnish	Materials in Supply Kit	(*Italics*
4-28. Me, Recycling, And Art Page _____ Date planned _____	Art Supplies	Camera (Polaroid Square Shooter) Film	One One roll Provide art s can be recy
4-29. Review Of Success Page _____ Date planned _____	35mm Slide projector	Worksheet 4-11 Slide 4-33 Slide 4-34 Slide 4-35 Slide 4-36 Worksheet 4-12	Review Of Suc Question 1 Re Question 2 Re Question 3 Re Question 4 Re Fate Of A New

PLANNING GUIDE

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e prepared several days or weeks in advance. Use this summary as
teaching and preparation schedule. All supplies needed are listed.

BSCS

ist of Supplies Needed		Notes and Suggestions to Teacher (*Italics and Arrow Indicate Advance Preparation Directions*)
ish	Materials in Supply Kit	
	Camera (Polaroid Square Shooter)	One
	Film	One roll
		Provide art supplies only at a minimum where no substitute can be recycled.
	Worksheet 4-11	Review Of Success
	Slide 4-33	Question 1 Review Of Success
	Slide 4-34	Question 2 Review Of Success
	Slide 4-35	Question 3 Review Of Success
	Slide 4-36	Question 4 Review Of Success
	Worksheet 4-12	Fate Of A Newspaper

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - d. Recognition of examples of man's impact upon the environment.

CORE C OBJECTIVES:

1. Perceive that garbage (solid waste) is a man-made problem through his:
    - c. Description of daily garbage.

MATERIALS

*String (strong enough to suspend a 25-pound weight)
*Plastic garbage bags or recycled plastic bags
*Plastic or rubber gloves
*Pail (plastic ice cream bucket)
Spring balance
Slide 4-32
Worksheet 4-10

*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-21. Garbage Weighers

In this activity students will work with a bag containing a day's accumulation of household garbage. This serves as a basis for determining the quantity of garbage they and the rest of the community produce. The relation of this amount to the amount produced by the entire community is developed.

Teacher Preparation:

About a week before this activity, tell the students about it and prepare the following dittoed note to send home to their parents.

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

d. Recognition of examples of man's impact upon the environment.

BJECTIVES:

Perceive that garbage (solid waste) is a man-made problem through his:

c. Description of daily garbage.

TEACHING STRATEGIES

. Garbage Weighers

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ulation of household garbage. This serves
r determining the quantity of garbage they
of the community produce. The relation of
o the amount produced by the entire community

ration:

before this activity, tell the students about
e the following dittoed note to send home to
.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

ACTIVITY 4-21. GARBAGE WEIGHERS

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- *--have collected and brought one day's accumulation of garbage from home.*
- *--have weighed the garbage and recorded the weight on the chart.*
- *--be able to relate his daily accumulation of garbage to the total daily amount produced by his community.*

MATERIALS

TEACHING STRATEGIES

Dear Parent:

On __(day)__ we would like to ask your help with a class project in our study of the environment. We will need a bag of all the trash and garbage that your family has accumulated the previous day. This project is being undertaken so the class can be made aware of the amounts of and specific things that make up garbage. Please help your child collect this garbage to bring to school on __(day)__. Keep the wet garbage separate in a plastic bag. (Plastic bags will be sent home for this purpose.)

Thank you,

(Teacher's name)

> If you decide that the above is impractical in your situation, save a couple of day's of your own trash accumulation and bring it in on the proper day.

Two days before the activity, remind students of their responsibility and send the plastic bags home. You should include a note that reminds the parents what the bags are for and remind them to save the garbage from the morning of the preceding day to the morning that the student leaves for school, 24 hours later. On the day of the activity, instruct students to tie a string around their bags of garbage so that they can weigh the bags by hooking the end of the spring balance under one of the strings. (They will weigh their garbage as you might weigh a fish.)

Say:

THIS IS A KIND OF SCALE USED TO WEIGH THINGS. TO WEIGH THINGS ON THIS SCALE YOU HANG THE

TEACHING STRATEGIES

ent:

y) we would like to ask your help with
project in our study of the environment.
need a bag of all the trash and garbage
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is project is being undertaken so the
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l on (day) . Keep the wet garbage
in a plastic bag. (Plastic bags will
home for this purpose.)

Thank you,

(Teacher's name)

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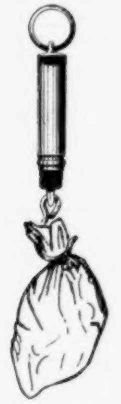
KIND OF SCALE USED TO WEIGH THINGS.
THINGS ON THIS SCALE YOU HANG THE

ANTICIPATED STUDENT BEHAVIORS

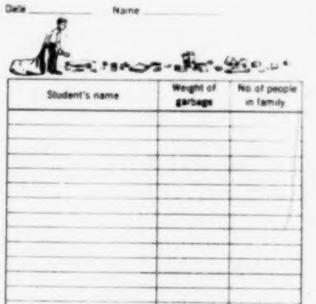
MATERIALS

Diagram 4-8



Slide 4-32

Worksheet 4-10



Date ______ Name ______

Student's name	Weight of garbage	No. of people in family
Total		

TEACHING STRATEGIES

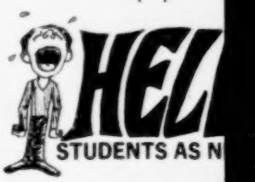
ITEM FROM THE HOOK ON THE BOTTOM AND SEE HOW FAR THE NEEDLE ON THE SCALE GOES DOWN.

DEMONSTRATE

Demonstrate the use of the spring balance by weighing one of the bags of garbage. (See Diagram 4-8.) Make certain that the string is looped several times so that it will not break when the garbage is suspended. If the quantity of garbage is large it would be best to divide it into two separate bags.

Say:

> WE WILL HANG OUR GARBAGE BAGS ON THE SCALE HOOK AND WEIGH THEM NOW.



Help students with this process, demonstrating how to tie the strings and read the balance. On the day of the weighing activity ask the janitor to have at least three garbage cans in your room. Distribute Worksheet 4-10 and project Slide 4-32. Discuss how to complete the worksheet. Have each student weigh his garbage and then fill in his chart as well as the one projected on the board. Have the students who did not bring any garbage for one reason or another, work with someone else. As an alternative you may

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ROM THE HOOK ON THE BOTTOM AND SEE HOW
E NEEDLE ON THE SCALE GOES DOWN.

DEMONSTRATE

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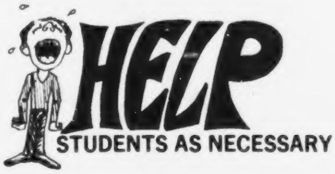

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ll as the one projected on the board. Have the
o did not bring any garbage for one reason or
rk with someone else. As an alternative you may

MATERIALS

TEACHING STRATEGIES

wish to make up the extra collections from your own garbage. After each student has weighed his garbage, contributed to the class chart, and completed his chart, ask:

> WE JUST WEIGHED OUR BAGS OF GARBAGE. YOU FOUND OUT HOW MUCH YOUR BAG WEIGHED. IF WE PUT ALL THE GARBAGE BAGS IN THE ROOM TOGETHER, HOW MUCH DO YOU THINK THEY WOULD WEIGH?
>
> HOW COULD WE FIND OUT?

> If students do not suggest adding the figures, say:
>
> WOULD OUR SCALE BE BIG ENOUGH TO HOLD ALL THE BAGS?
>
> HOW COULD WE USE SOME OF OUR MATH TO FIGURE THIS OUT?

Point out the advantage of adding the weights listed in the second column of Worksheet 4-10 and not having to reweigh all of the garbage. This will be a good arithmetic exercise for students. You may need to help students with their addition, especially in converting ounces to pounds.

> EACH OF YOU RECORDED HOW MANY PEOPLE IN YOUR FAMILY HELPED MAKE YOUR BAG OF GARBAGE. HOW COULD WE FIND OUT HOW MANY PEOPLE MADE ALL THIS (point) GARBAGE?

Lead students to suggest addition of column 3 on their chart.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
e up the extra collections from your own fter each student has weighed his garbage, to the class chart, and completed his chart,	
T WEIGHED OUR BAGS OF GARBAGE. YOU FOUND V MUCH YOUR BAG WEIGHED. IF WE PUT ALL RBAGE BAGS IN THE ROOM TOGETHER, HOW MUCH THINK THEY WOULD WEIGH?	--respond, "I don't know."
ULD WE FIND OUT?	--suggest adding column 2 in the chart, weighing all of them together.
f students do not suggest adding the igures, say:	
OULD OUR SCALE BE BIG ENOUGH TO HOLD L THE BAGS?	--respond, "No."
W COULD WE USE SOME OF OUR MATH TO IGURE THIS OUT?	--respond, "Add," "I don't know."
e advantage of adding the weights listed in the n of Worksheet 4-10 and not having to reweigh garbage. This will be a good arithmetic students. You may need to help students with on, especially in converting ounces to pounds.	
T YOU RECORDED HOW MANY PEOPLE IN YOUR HELPED MAKE YOUR BAG OF GARBAGE. HOW E FIND OUT HOW MANY PEOPLE MADE ALL THIS GARBAGE?	--add the third column of the chart and respond, "X number."
s to suggest addition of column 3 on their	

MATERIALS

TEACHING STRATEGIES

WE HAVE ____ (number) OF PEOPLE AND ____ POUNDS OF GARBAGE. WE WANT TO SPLIT THIS PILE OF GARBAGE INTO AN EQUAL PILE FOR EACH PERSON TO SEE HOW MUCH GARBAGE EACH PERSON WOULD MAKE. DOES ANYONE KNOW HOW WE COULD DO THIS?

> If no one suggests division, use a package of candy, toothpicks, or corns to put across the idea of equal division of quantity of something to each member of the class. Ask for ways in which you can be certain that each member gets an equal amount.

In any event, continue by saying:

ONE WAY WE CAN FIGURE THIS OUT IS TO USE MATH AND DIVIDE. WATCH WHILE I DO THE DIVISION. HOW MANY PEOPLE DO WE HAVE?

Write the number on the chalkboard.

HOW MANY POUNDS OF GARBAGE DO WE HAVE?

Write the number of pounds to the left of the number of people. Divide while verbally saying what you are doing. When you get an answer, ask:

HOW MANY POUNDS OF GARBAGE DID EACH PERSON MAKE?

Leave the garbage per person figure on the chalkboard.

St

--

--

--

t

TEACHING STRATEGIES

E ____ (number) OF PEOPLE AND ____ POUNDS
BAGE. WE WANT TO SPLIT THIS PILE OF
E INTO AN EQUAL PILE FOR EACH PERSON
HOW MUCH GARBAGE EACH PERSON WOULD
DOES ANYONE KNOW HOW WE COULD DO THIS?

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vide while verbally saying what you are doing.
t an answer, ask:

NY POUNDS OF GARBAGE DID EACH PERSON MAKE?

arbage per person figure on the chalkboard.

ANTICIPATED STUDENT BEHAVIORS

Students:

--will suggest such things as: "Give one item to each person at a time," "Separate into piles and count out each pile," "Divide the number of people into the number of items."

--respond with the number of people in class.

--respond with the number of pounds of garbage the class has.

MATERIALS

TEACHING STRATEGIES

Continue by asking:

HOW LONG DID IT TAKE YOUR FAMILY TO MAKE THE BAGS OF GARBAGE?

HOW MANY PEOPLE ARE IN YOUR FAMILY, (student's name)?

HOW MANY PEOPLE ARE IN YOUR FAMILY, (student's name)?

WHO MADE MORE POUNDS OF GARBAGE?

WHY?

WHAT ARE SOME OTHER REASONS? WHY MIGHT A FAMILY OF THREE SOMETIMES HAVE MORE GARBAGE THAN A FAMILY OF FOUR OR FIVE?

WE HAVE SEEN HOW MUCH GARBAGE EACH FAMILY MAKES AND HOW MUCH ALL THE FAMILIES IN OUR CLASS MAKE: NOW LET'S SEE HOW MUCH GARBAGE OUR (city, town, village) MAKES.

If students do not know the population of your city, (which they probably do not), provide the figure for them.

Then ask:

HOW MANY POUNDS OF GARBAGE DO THE PEOPLE IN OUR CITY PRODUCE IN ONE DAY?

WE FOUND OUT HOW MANY POUNDS OF GARBAGE A PERSON MAKES. HOW COULD WE FIGURE IT OUT?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
asking:	Students:
NG DID IT TAKE YOUR FAMILY TO MAKE THE F GARBAGE?	--respond, "One day."
NY PEOPLE ARE IN YOUR FAMILY, (student's	--respond with the number of people in his family.
NY PEOPLE ARE IN YOUR FAMILY, (student's	--respond with the number of people in his family.
DE MORE POUNDS OF GARBAGE?	--respond, "The family that had more people."
	--respond, "Because they had more people in their family."
RE SOME OTHER REASONS? WHY MIGHT A FAMILY EE SOMETIMES HAVE MORE GARBAGE THAN A OF FOUR OR FIVE?	--suggest that some people are more wasteful, that some families have more things than others, or that some people can afford to discard more items than others can.
E SEEN HOW MUCH GARBAGE EACH FAMILY MAKES W MUCH ALL THE FAMILIES IN OUR CLASS MAKE: T'S SEE HOW MUCH GARBAGE OUR (city, town, e) MAKES.	
do not know the population of your city, (which y do not), provide the figure for them.	
Y POUNDS OF GARBAGE DO THE PEOPLE IN Y PRODUCE IN ONE DAY?	--respond, "I don't know."
D OUT HOW MANY POUNDS OF GARBAGE A MAKES. HOW COULD WE FIGURE IT OUT?	--some may respond, "Multiply by the number of people in our city."

MATERIALS

TEACHING STRATEGIES

If they don't respond, suggest multiplying. If possible allow a more able student to compute it.

NOTE: Formula to follow is:

pounds of garbage per person (which you have already computed)

times

number of people in the city

equals

pounds of garbage for all people in the city

HOW MUCH GARBAGE DOES OUR CITY PRODUCE?

IS THAT VERY MUCH GARBAGE?

In order to make the amount concrete, determine how many truckloads that would fill. This is all the more impressive when one considers that the rubbish is compressed in the truck. Use an average of 40,000 pounds (20 tons) per truck to figure this out. Do the computation yourself.

THIS AMOUNT OF GARBAGE IS ENOUGH TO FILL
____ GARBAGE TRUCKS. THUS, OUR CITY
MAKES ENOUGH GARBAGE, TRASH, AND RUBBISH
TO FILL ____ TRUCKS IN ONE DAY.

IS THAT VERY MUCH GARBAGE?

At this point students should be somewhat impressed with the large numbers and the large amounts of garbage. In

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
't respond, suggest multiplying. If possible e able student to compute it.	
ula to follow is:	
ds of garbage per person (which you already computed)	
s	
er of people in the city	
ls	
ds of garbage for all people in the	
CH GARBAGE DOES OUR CITY PRODUCE?	--look at the computation just completed and repeat the answer.
T VERY MUCH GARBAGE?	--will probably indicate that it is a large amount.
make the amount concrete, determine how many that would fill. This is all the more impres- ne considers that the rubbish is compressed in Use an average of 40,000 pounds (20 tons) o figure this out. Do the computation yourself.	
MOUNT OF GARBAGE IS ENOUGH TO FILL ARBAGE TRUCKS. THUS, OUR CITY ENOUGH GARBAGE, TRASH, AND RUBBISH L ____ TRUCKS IN ONE DAY.	
T VERY MUCH GARBAGE?	
nt students should be somewhat impressed with mbers and the large amounts of garbage. In	

MATERIALS

TEACHING STRATEGIES

the next activity, students will have more sensory contact with their garbage. The film in Activity 4-23 will further magnify the garbage problem.

In Activity 4-22, students will separate their bags of garbage into categories based on the materials making up the garbage.

TEACHING STRATEGIES

tivity, students will have more sensory
h their garbage. The film in Activity 4-23
r magnify the garbage problem.

4-22, students will separate their bags
into categories based on the materials
e garbage.

ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE C
ACTIVITY 4-21: "Garbage Weighers"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ____

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	→ ________ ________ ________ ________
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless

BSCS Evaluation: EMH Feedback Form 1c

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No - Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No - Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. How many students understood the numbers in weight of garbage comparisons?
☐ None ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ All: Comment.

18. Were there indications that the activity brought about unpleasantness or embarrassment to the student or his family? ☐ No ☐ Yes: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C
ACTIVITY 4-21: "Garbage Weighers"

Teacher ____________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my
Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - b. Understanding of the role of decomposers.
    - d. Recognition of examples of man's impact upon the environment.

CORE C OBJECTIVES:

1. Perceive that garbage (solid waste) is a man-made problem through his:
    - a. Understanding of the concept of biodegradable and nonbiodegradable.
    - b. Realization that satisfactory solid waste disposal is difficult.
    - c. Description of daily garbage.

3. Exhibit a positive attitude towards microbes that decompose garbage.

MATERIALS

TEACHING STRATEGIES

Activity 4-22. Garbage Probe

First analyzing what's in garbage and then relating that to its ability to be decomposed will be used in defining biodegradable and nonbiodegradable. From this background some of the impact that garbage has on us can be understood.

OCUS FOR THIS ACTIVITY

OALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

  b. Understanding of the role of decomposers.

  d. Recognition of examples of man's impact upon the environment.

OBJECTIVES:

Perceive that garbage (solid waste) is a man-made problem through his:

  a. Understanding of the concept of biodegradable and nonbiodegradable.

  b. Realization that satisfactory solid waste disposal is difficult.

  c. Description of daily garbage.

Exhibit a positive attitude towards microbes that decompose garbage.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

ACTIVITY 4-22. GARBAGE PROBE

BSCS

TEACHING STRATEGIES

22. Garbage Probe

zing what's in garbage and then relating that ity to be decomposed will be used in defining le and nonbiodegradable. From this background impact that garbage has on us can be

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have separated his garbage collection into various categories.
--have inspected his compost and concluded that certain things do not decompose as readily as others.
--be able to define biodegradable and nonbiodegradable.

ACTIVITY 4-22

(134)

MATERIALS

- *Spoons
- *Newspapers
- *Plastic or rubber gloves
- *Pail (plastic ice cream bucket)
- Spring balance
- *Compost (started and used in Core B)
- *Packages with the term biodegradable on it
- Worksheet 4-4

*Not furnished in materials kit

TEACHING STRATEGIES

Give each student plenty of newspapers to spread on his work table. Have students use plastic or rubber gloves to cover their hands when handling the garbage. Ask them why they are using the gloves. They should relate this to harmful microbes and easily tell you why. Some of the garbage may smell, but this is part of the effect! (Open your windows or work outside, weather permitting.) Allow students to create their own categories for separating the garbage before starting to sort; list the categories on the chalkboard. The following categories will probably be suggested:

Plastic and rubber
Metal
Paper, wood, and cloth
Glass
Food (in plastic bag)
Other (questionable and rare products)

Have a spot for the various kinds of materials. Have them separate their garbage into piles based on these categories. Locate a central collection spot. After separating their garbage, have them deliver their products to the central place. Make sure they include the bag the garbage came in and the newspapers they just used.

When all the garbage has been separated and the room is back in order, delegate certain students to weigh each category of material. Do this by placing the items in a bucket (previously weighed) and weighing with the spring balance. Remind the students the weight will include the weight of the bucket. Subtract the bucket's weight from

TEACHING STRATEGIES

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 Have students use plastic or rubber gloves to
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emind the students the weight will include the
e bucket. Subtract the bucket's weight from

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have identified items which could be recycled.
--have suggested alternate materials to be used for throw away items which do decompose.

--recall previous grouping activities and arrive at useful groups.

--separate garbage and put in appropriate place.

MATERIALS

TEACHING STRATEGIES

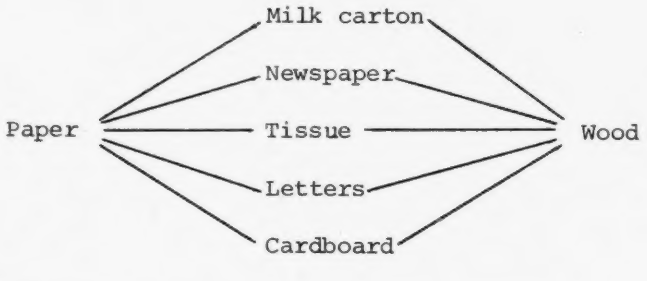
the total to determine the weight of the garbage. Have each student get involved with weighing at least one category. Record the weights on the chalkboard alongside the category name. Instruct the students to take garbage (in the same bundles as when weighed) to the school disposal unit. When complete, ask:

> WHAT MATERIALS DO WE HAVE THE MOST OF IN OUR GARBAGE?
>
> WHERE DO WE GET THIS MATERIAL FROM?

GIVE STUDEN
TIME
TO
THINK

The most common category will probably be paper. The categories students are most likely not to know will be plastics (petroleum products) and glass (sand). Trace with your students the source of all the categories.

For example:


Paper
Milk carton
Newspaper
Tissue
Letters
Cardboard
Wood

Then ask:

TEACHING STRATEGIES

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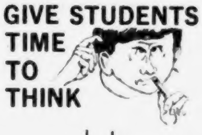
GIVE STUDENTS
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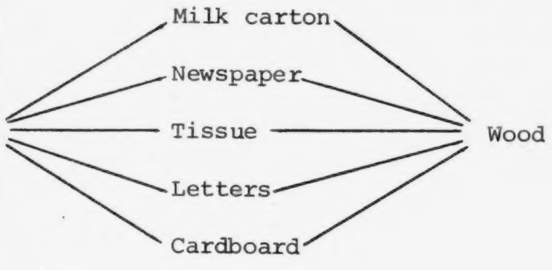

Milk carton
Newspaper
Tissue
Letters
Cardboard
Wood

ANTICIPATED STUDENT BEHAVIORS

Students:

--examine the weights measured and identify the most common material in their garbage.

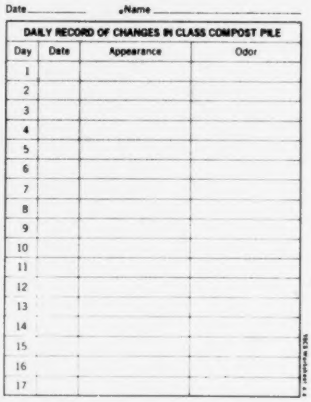
--trace source of the most common category.

ACTIVITY 4-22

(136)

MATERIALS

Worksheet 4-4



Date__________ Name ____________________

DAILY RECORD OF CHANGES IN CLASS COMPOST PILE

Day	Date	Appearance	Odor
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

TEACHING STRATEGIES

IF ALL PEOPLE IN THE UNITED STATES USE ____ POUNDS OF (most common category - paper) IN A DAY, WHAT WILL HAPPEN EVENTUALLY?

IF WE KEEP USING THIS MUCH (paper) EVERY DAY, WHAT WILL HAPPEN TO OUR PAPER SUPPLY?

WHAT CAN WE DO SO THIS WILL NOT HAPPEN?

CAN ANY OF THESE THINGS (point to the list of categories) BE USED AGAIN?

WHICH ONES WOULD BE THE EASIEST TO USE OVER?

IF WE THROW OUR GARBAGE OUT, WHERE DOES IT GO?

Point to the list on the chalkboard.

WHAT WILL HAPPEN TO THESE MATERIALS IN THE DUMP?

LET'S LOOK AT OUR COMPOST ONCE AGAIN.

At this point take out the compost boxes that were set up and inspected in Core B and distribute the student copies of Worksheet 4-4 that were filled in by the students in Core B.

SORT THROUGH THE COMPOST. WHAT THINGS HAVE NOT CHANGED IN APPEARANCE?

HAVE
INVO
ALL
STUDE

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
L PEOPLE IN THE UNITED STATES USE POUNDS OF (most common category - IN A DAY, WHAT WILL HAPPEN EVENTUALLY?	--respond, "Garbage will build up."
KEEP USING THIS MUCH (paper) EVERY WHAT WILL HAPPEN TO OUR PAPER SUPPLY?	--infer that we will run out of that material.
CAN WE DO SO THIS WILL NOT HAPPEN?	--respond, "Use less," "Use it over again."
NY OF THESE THINGS (point to the list of ories) BE USED AGAIN?	--respond, "Yes."
ONES WOULD BE THE EASIEST TO USE OVER?	--identify things such as bottles, bags, and cans that can be used again.
THROW OUR GARBAGE OUT, WHERE DOES IT GO?	--respond, "To the dump," "Garbage truck."
ne list on the chalkboard.	
VILL HAPPEN TO THESE MATERIALS IN THE	--predict the fate of each material.
LOOK AT OUR COMPOST ONCE AGAIN.	
nt take out the compost boxes that were set up ted in Core B and distribute the student copies t 4-4 that were filled in by the students in	
THROUGH THE COMPOST. WHAT THINGS HAVE HANGED IN APPEARANCE?	--sort through and inspect the compost. They will state that the piece of glass, metal bottle cap, and piece of plastic remained unchanged when compared with the rest of the material.

HAVE YOU INVOLVED ALL STUDENTS?

MATERIALS	TEACHING STRATEGIES

Point to the list on the chalkboard.

> HOW ARE THESE MATERIALS LIKE THE ONES WE BURIED IN OUR COMPOST?
>
> EVENTUALLY, WHAT WILL HAPPEN TO SOME OF THE MATERIALS IN THE DUMP?

GIVE SEVER
STUDENTS A C
TO RESPON

> WHAT CAUSED SOME OF OUR COMPOST MATERIALS TO BREAK DOWN?

Then say:

> WE HAVE A SPECIAL NAME FOR THOSE THINGS THAT ARE BROKEN DOWN BY DECOMPOSERS. THE WORD IS BIODEGRADABLE.

Write the term on the chalkboard. It literally means (bio = life, degrade = decompose) easily broken down by living organisms, in this case, microbes. Perhaps you have seen this word on some of the things you have bought in the grocery store. Pass around any packages that have this term on it.

> WHAT DOES THIS MEAN ABOUT THIS PACKAGE OR ITS CONTENTS?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
he list on the chalkboard.	
RE THESE MATERIALS LIKE THE ONES WE D IN OUR COMPOST?	--identify similar materials.
UALLY, WHAT WILL HAPPEN TO SOME OF THE IALS IN THE DUMP?	--on the basis of their experience with the compost, will predict that some will decompose and others will not.
AUSED SOME OF OUR COMPOST MATERIALS AK DOWN?	--recall that microbes, scavengers, and decomposers break down certain materials.
E A SPECIAL NAME FOR THOSE THINGS THAT OKEN DOWN BY DECOMPOSERS. THE WORD IS RADABLE.	
erm on the chalkboard. It literally means , degrade = decompose) easily broken down by nisms, in this case, microbes. Perhaps you his word on some of the things you have he grocery store. Pass around any packages his term on it.	
OES THIS MEAN ABOUT THIS PACKAGE OR ITS TS?	--indicate their understanding of the word by responding, "It will be broken down by decomposers."

GIVE SEVERAL STUDENTS A CHANCE TO RESPOND

MATERIALS

TEACHING STRATEGIES

LET'S LIST SOME BIODEGRADABLE THINGS. MATERIALS THAT ARE NOT BROKEN DOWN BY DECOMPOSERS ARE CALLED NONBIODEGRADABLE.

Write the term on the chalkboard.

WHAT ARE SOME NONBIODEGRADABLE THINGS?

SINCE SOME THINGS IN GARBAGE DO NOT DECOMPOSE VERY FAST, WHAT COULD BE DONE TO KEEP THEM OUT OF THE GARBAGE?

WHAT MATERIALS IN OUR GARBAGE COULD BE REUSED?

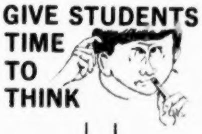
**GIVE STUDE
TIME
TO
THINK**

WHAT BIODEGRADABLE THINGS COULD BE USED IN PLACE OF THE NONBIODEGRADABLE ITEMS THROWN AWAY IN OUR GARBAGE?

**ASK F R
OTHER IDE**

The questions at the end of this activity are by no means exhaustive or complete. They are merely introductory to

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
S LIST SOME BIODEGRADABLE THINGS. MATERIALS ARE NOT BROKEN DOWN BY DECOMPOSERS ARE ED NONBIODEGRADABLE.	--will suggest things such as paper, food wastes, leaves, grass, etc.
term on the chalkboard.	
ARE SOME NONBIODEGRADABLE THINGS?	--relate the meaning of the word to actual materials by answering: glass, plastic, bottle caps, metal, etc.
E SOME THINGS IN GARBAGE DO NOT DECOMPOSE FAST, WHAT COULD BE DONE TO KEEP THEM OUT HE GARBAGE?	--suggest using only biodegradable things or reusing things that are nonbiodegradable.
MATERIALS IN OUR GARBAGE COULD BE REUSED?	--identify such things as plastic bags, bottles, etc.



TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
BIODEGRADABLE THINGS COULD BE USED IN PLACE HE NONBIODEGRADABLE ITEMS THROWN AWAY IN OUR AGE?	--suggest the use of paper instead of plastics or glass, etc.

ASK FOR
OTHER IDEAS

ions at the end of this activity are by no means or complete. They are merely introductory to

MATERIALS

TEACHING STRATEGIES

Activity 4-23, which will shed more light on the garbage problem.

> TOMORROW WE'LL SEE A FILM ON GARBAGE THAT MIGHT ANSWER SOME OF THESE QUESTIONS OR HELP US TO ASK MORE.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
, which will shed more light on the garbage WE'LL SEE A FILM ON GARBAGE THAT MIGHT OME OF THESE QUESTIONS OR HELP US TO .	

UNIT IV, CORE C
ACTIVITY 4-22: "Garbage Probe"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: (Number) | Name students you noted especially:

HIGH INTEREST ________ → ________ ________ ________ ________
MODERATE INTEREST ________
INDIFFERENCE ________
MODERATE RESISTANCE ________
STRONG DISLIKE ________ → ________ ________ ________ ________
HARD TO RATE ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

BSCS Evaluation: **EMH Feedback Form 1c**

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

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11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. List sources of garbage categories which you or your students were unable to trace.

18. Were the students able to distinguish between biodegradable and nonbiodegradable materials? ☐ Yes ☐ No: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C
ACTIVITY 4-22: "Garbage Probe"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
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5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE C OBJECTIVES:

1. Perceive that garbage (solid waste) is a man-made problem through his:
    - a. Understanding of the concept of biodegradable and nonbiodegradable.
    - b. Realization that satisfactory solid waste disposal is difficult.
3. Exhibit a positive attitude towards microbes that decompose garbage.

MATERIALS

TEACHING STRATEGIES

Activity 4-23. Garbage

A film, Garbage, *follows the route trash takes when discarded. It is designed to instill in the viewer a feeling of being inundated in garbage.*

OCUS FOR THIS ACTIVITY

OALS:

. Appreciate the cycling relationships of the materials and organisms in the environment through:

d. Recognition of examples of man's impact upon the environment.

. Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

. Perceive that garbage (solid waste) is a man-made problem through his:

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. Exhibit a positive attitude towards microbes that decompose garbage.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

ACTIVITY 4-23. GARBAGE

BSCS

TEACHING STRATEGIES

23. Garbage

bage, *follows the route trash takes when*
It is designed to instill in the viewer a
being inundated in garbage.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- -*have viewed the film* Garbage.
- -*have participated in a discussion of the film.*
- -*have made predictions about the appearance of the community refuse disposal site.*
- -*have listed scavengers that might be at the dump.*

ACTIVITY 4-23

(142)

MATERIALS

*Film, *Garbage* (King Screen Productions)
*16mm Movie sound projector
*Screen

*Not furnished in materials kit

TEACHING STRATEGIES

To add visual impact to the previous two activities you should now show the 11-minute film *Garbage* to the class It documents one of the routines trash can take when discarded and follows the context of this core well. Holt, Rinehart and Winston, Inc., Media Department, 383 Madison Avenue, New York, New York, 10017, is the source for purchase of the film at $135.00. It can be rented for about $15.00 from the producers or numerous film libraries.

Begin the class period by saying:

> LET'S WATCH THIS FILM. SEE HOW LONG IT TAKES YOU TO FIGURE OUT WHAT IT IS ABOUT.

The film has no dialogue. Do not give an explanation of what is occurring. This will allow the students to give unbiased impressions once the projection is completed.

When the film is over, ask:

> WHAT DID YOU THINK ABOUT AS YOU WATCHED THE FILM?
>
> DO YOU THINK THE FILM IS WELL NAMED?
>
> WHAT DID THE FILM SHOW YOU?

GIVE SEVE
STUDENTS A
TO RESP

TEACHING STRATEGIES

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show the 11-minute film *Garbage* to the class
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U THINK THE FILM IS WELL NAMED?

DID THE FILM SHOW YOU?

ANTICIPATED STUDENT BEHAVIORS

Students:

--should recall their own impressions and thoughts.

--will indicate that all it showed was garbage, so that's a good name for it.

--respond, "What happens to garbage," "How much garbage people have," "Garbage collection is a big business," "Garbage is handled by lots of people before it goes to the dump (landfill)," "There's more to garbage collecting than I thought there was," etc.

GIVE SEVERAL STUDENTS A CHANCE TO RESPOND

MATERIALS

TEACHING STRATEGIES

Continue probing until the students have nothing more to say. Then continue by asking:

> WHAT ARE SOME OF THE DIFFERENT JOBS PEOPLE HAVE IN WORKING WITH GARBAGE?

ASK FOR OTHER IDEAS

List responses on the chalkboard.

> (Student's name), HOW MANY MEN DO YOU THINK OUR CITY HIRES TO HANDLE GARBAGE?

Ask many students their opinions. Put the responses on the chalkboard and keep a record of the answers.

> (Student's name), HOW MUCH MONEY DO YOU THINK OUR CITY SPENDS EACH YEAR TO HANDLE GARBAGE?

Ask many students what their guess is.

Put these figures on the chalkboard, too, and keep a record of these answers.

Say to the class:

> SOME CITIES IN THE UNITED STATES SPEND MORE MONEY EACH YEAR GETTING RID OF GARBAGE THAN THEY SPEND FOR BOTH FIRE AND POLICE PROTECTION. THE MONEY IS SPENT TO PAY ALL THE PEOPLE WHO PICK UP THE GARBAGE, DRIVE THE TRUCKS, WORK AT THE DUMP, AND ALSO TO PAY FOR EQUIPMENT,

A

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--wi

--wi

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
oing until the students have nothing more to ontinue by asking:	
SOME OF THE DIFFERENT JOBS PEOPLE WORKING WITH GARBAGE?	--respond, "Garbagemen," "Garbage truck driver," "Truck driver," "Truck unloader," "Caterpillar driver."
s on the chalkboard.	
's name), HOW MANY MEN DO YOU THINK HIRES TO HANDLE GARBAGE?	--will make a variety of guesses.
ents their opinions. Put the responses on d and keep a record of the answers.	
's name), HOW MUCH MONEY DO YOU THINK SPENDS EACH YEAR TO HANDLE GARBAGE?	--will again make a variety of guesses.
ents what their guess is.	
ures on the chalkboard, too, and keep a se answers.	
ass:	
IES IN THE UNITED STATES SPEND MORE CH YEAR GETTING RID OF GARBAGE THAN ND FOR BOTH FIRE AND POLICE PROTECTION. Y IS SPENT TO PAY ALL THE PEOPLE WHO THE GARBAGE, DRIVE THE TRUCKS, WORK UMP, AND ALSO TO PAY FOR EQUIPMENT,	

ASK FOR OTHER IDEAS

MATERIALS

TEACHING STRATEGIES

GASOLINE, AND FIXING THE EQUIPMENT. SOMETIMES THE DUMP MAY BE AS FAR AS FIFTY MILES FROM WHERE THE GARBAGE IS PICKED UP.

WHAT WAS THE MAN DRIVING THE TRACTOR WEARING ON HIS FACE?

> If the students did not notice the mask, tell them that he was wearing a mask and then ask:

WHY WAS HE WEARING A MASK?

WHY DO DUMPS STINK?

WHAT IS CAUSING THE GARBAGE TO ROT OR DECOMPOSE?

WHAT IS A MICROBE?

ARE THE MICROBES IN A DUMP HARMFUL?

Ask the students to defend their answers.

WHAT ELSE WOULD YOU SEE BREAKING DOWN OR EATING THE GARBAGE AT THE DUMP?

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TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
NE, AND FIXING THE EQUIPMENT. SOMETIMES UMP MAY BE AS FAR AS FIFTY MILES FROM THE GARBAGE IS PICKED UP.	Students:
AS THE MAN DRIVING THE TRACTOR WEARING ON CE?	--respond, "Mask," "Don't know," "Can't remember."
f the students did not notice the mask, ell them that he was wearing a mask and hen ask:	
S HE WEARING A MASK?	--respond, "Dump stinks," "There are microbes in the air," "Keep microbes out of his mouth and nose."
DUMPS STINK?	--respond, "The garbage is rotting or decomposing."
S CAUSING THE GARBAGE TO ROT OR DECOMPOSE?	--respond, "Microbes," "Rotten stuff," "Bugs."
S A MICROBE?	--recall experiences in Core A of Unit II and Core B of Unit IV and give statements such as: "Small living things too small to see without a magnifier," "Living things that decompose biodegradable substances," "We call some of them germs."
E MICROBES IN A DUMP HARMFUL?	--can give two opposing answers, depending upon their point of view. Those who have the disease concept foremost in mind will probably answer, "Yes"; those who have the decomposition concept in mind will probably say, "No."
dents to defend their answers.	
SE WOULD YOU SEE BREAKING DOWN OR THE GARBAGE AT THE DUMP?	--respond, "Rats," "Mice," "Cockroaches."

MATERIALS

TEACHING STRATEGIES

WHAT DO WE CALL ALL THESE ANIMALS?

> If the words scavenger and pest do not come up, remind the students of the slides on scavengers and the pill bugs. Then ask:

WHY DO WE SOMETIMES CALL THESE ANIMALS PESTS?

Ask for pests the students might expect to find around garbage and list them on the chalkboard. Point out that these pests might be anywhere there is garbage which includes: the home, street, etc.

IN WHAT WAY ARE THESE "PESTS" HELPFUL?

Then say:

BECAUSE THESE PARTICULAR SCAVENGERS ARE GENERALLY CONSIDERED UNPLEASANT, MAN USUALLY TRIES TO CONTROL THEM. HOW CAN WE CONTROL THESE PESTS?

You may have to explain what the meaning of control is in this sense.

Say:

LET'S LOOK AT THE FILM AGAIN AND THIS TIME LOOK FOR TWO THINGS: FIRST, WATCH FOR WAYS TO CONTROL, AND SECOND, LOOK FOR THE KINDS OF THINGS THAT GARBAGE IS MADE UP OF.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
E CALL ALL THESE ANIMALS?	Students: --respond, "Scavengers," "Pests," or possibly "Decomposers."
he words scavenger and pest do not up, remind the students of the slides cavengers and the pill bugs. Then	
SOMETIMES CALL THESE ANIMALS PESTS?	--respond, "Something we don't like," "Things that are harmful," "Animals that carry disease."
the students might expect to find around st them on the chalkboard. Point out that ght be anywhere there is garbage which home, street, etc.	
AY ARE THESE "PESTS" HELPFUL?	--relate the scavenger and decomposing habits of certain pests to the breakdown of biodegradable substances and to the ultimate recycling of materials back into the environment.
HESE PARTICULAR SCAVENGERS ARE CONSIDERED UNPLEASANT, MAN RIES TO CONTROL THEM. HOW CAN WE HESE PESTS?	--respond, "Kill them," "Shoot them," "Spray them."
o explain what the meaning of control is	
K AT THE FILM AGAIN AND THIS TIME TWO THINGS: FIRST, WATCH FOR WAYS L, AND SECOND, LOOK FOR THE KINDS OF AT GARBAGE IS MADE UP OF.	

ACTIVITY 4-23

(146)

MATERIALS

TEACHING STRATEGIES

Show the film again.

WHAT ARE SOME WAYS GARBAGE PESTS CAN BE CONTROLLED OR GOTTEN RID OF?

If these responses do not come up, suggest them and point out that each of these is a way of changing the habitat of the pests so he cannot feed on the garbage as easily.

Then ask:

WHAT ARE SOME OF THE THINGS YOU SAW BEING UNLOADED AT THE GARBAGE DUMP?

ACCEPT A
ANSWERS

WHICH THINGS THAT YOU SAW WILL ROT OR DECOMPOSE EASILY?

List on the chalkboard.

WHAT DO WE CALL THESE THINGS THAT ARE DECOMPOSED EASILY?

On chalkboard title list Biodegradable.

WHICH THINGS THAT YOU SAW WILL NOT ROT OR DECOMPOSE EASILY?

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
film again.	Students:
ARE SOME WAYS GARBAGE PESTS CAN BE ROLLED OR GOTTEN RID OF?	--respond, "Using cans for storage," "Tight fitting lids on cans," "Burying garbage," "Spraying," "Keeping garbage picked up."
responses do not come up, suggest them and point each of these is a way of changing the habitat sts so he cannot feed on the garbage as easily.	
ARE SOME OF THE THINGS YOU SAW BEING DED AT THE GARBAGE DUMP?	--respond, "Food," "Clothes," "Toys."
THINGS THAT YOU SAW WILL ROT OR POSE EASILY?	--list those things which will rot easily: plant materials such as lettuce, cabbage, grass clippings, etc.; animal matter such as meat scraps, bones, hair, etc.
e chalkboard.	
DO WE CALL THESE THINGS THAT ARE POSED EASILY?	--recall the word biodegradable.
ard title list Biodegradable.	
THINGS THAT YOU SAW WILL NOT ROT OR OSE EASILY?	--list those things which will not rot easily, such as metal, rubber, plastic, paper, etc.

ACCEPT ALL ANSWERS

MATERIALS

TEACHING STRATEGIES

List on the chalkboard.

WHAT DO WE CALL THESE THINGS THAT ARE NOT DECOMPOSED EASILY?

On other chalkboard title list Nonbiodegradable.

WHAT WILL HAPPEN TO THE THINGS THAT DON'T ROT OR DECOMPOSE EASILY?

WHICH THINGS THAT YOU SAW DO WE HAVE BURIED IN OUR COMPOST?

List on the chalkboard.

Conclude the activity by saying:

TOMORROW WE ARE GOING TO VISIT A (dump, school trash site, city incinerator, central collection point) TO SEE HOW OUR (city, school) GETS RID OF ITS GARBAGE. WHAT WOULD IT BE BEST FOR US TO WEAR?

WHY?

WHAT WILL WE SEE AT THE (dump, school trash site, city incinerator, central collection point)?

As the students suggest items, write them on the chalkboard. Keep the list until after students have been to the dump, and then make any deletions or additions.

Review school field trip policies with students if necessary.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
chalkboard.	
WE CALL THESE THINGS THAT ARE NOT SED EASILY?	--recall the word nonbiodegradable.
lkboard title list Nonbiodegradable.	
LL HAPPEN TO THE THINGS THAT DON'T DECOMPOSE EASILY?	--respond, "Make a mess," "Stay there."
HINGS THAT YOU SAW DO WE HAVE IN OUR COMPOST?	--list items they have buried.
chalkboard.	
activity by saying:	
W WE ARE GOING TO VISIT A (dump, trash site, city incinerator, collection point) TO SEE HOW OUR school) GETS RID OF ITS GARBAGE. ULD IT BE BEST FOR US TO WEAR?	--respond, "Old clothes," "Dirty clothes," "Get masks."
	--respond, "It's dirty there."
LL WE SEE AT THE (dump, school trash ity incinerator, central collection	--suggest items that they predict they will see.
nts suggest items, write them on the Keep the list until after students have dump, and then make any deletions or	
l field trip policies with students if	

UNIT IV, CORE C
ACTIVITY 4-23: "Garbage"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with:	(Number)	Name students you noted especially:
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No - Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No - Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

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12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did pupils seem confused at the opposing points of view as to whether microbes are harmful? ☐ No ☐ Yes: Comment.

18. Did you find it necessary to give an explanation of controlling pests?
☐ No ☐ Yes: If yes, what explanation did you give?

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C
ACTIVITY 4-23: "Garbage"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.
☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - b. Understanding of the role of decomposers.
    - d. Recognition of examples of man's impact upon the environment.

CORE C OBJECTIVES:

1. Perceive that garbage (solid waste) is a man-made problem through his:
    - a. Understanding of the concept of biodegradable and nonbiodegradable.
    - b. Realization that satisfactory solid waste disposal is difficult.
    - c. Description of daily garbage.
2. Accept the need for recycling materials through his:
    - b. Identification of uses for various components of solid waste.
3. Exhibit a positive attitude towards microbes that decompose garbage.

CUS FOR THIS ACTIVITY

ALS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

b. Understanding of the role of decomposers.

d. Recognition of examples of man's impact upon the environment.

OBJECTIVES:

Perceive that garbage (solid waste) is a man-made problem through his:

a. Understanding of the concept of biodegradable and nonbiodegradable.

b. Realization that satisfactory solid waste disposal is difficult.

c. Description of daily garbage.

Accept the need for recycling materials through his:

b. Identification of uses for various components of solid waste.

Exhibit a positive attitude towards microbes that decompose garbage.

UNIT IV.	TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT
CORE C.	GARBAGE AND MY ENVIRONMENT
ACTIVITY 4-24.	IT'S A REAL DUMP

BSCS

MATERIALS

TEACHING STRATEGIES

Activity 4-24. It's A Real Dump

In this activity students will visit their community's garbage dump, central trash collection site, incinerator, or school trash area. They will gain knowledge of how trash is disposed of in their immediate environment. The value of this experience is that the students are able to see the disposal of garbage, first-hand and begin to understand the problems of disposing of nonbiodegradable materials.

Teacher Preparation:

Contact the manager of the city dump, incinerator, collection site, or school trash area at least a week before the planned visit. You might wish to have him be present and explain the city operation of garbage disposal either in the classroom before or after the visit or at the dump the day of the visit. Set a mutually satisfactory date and time for the visit, with an alternate date in case of inclement weather. Call again the day before the visit to be sure everything is still all right. If your community has a landfill, the city administration may prefer to use the words sanitary landfill instead of dump to describe it.

While on the visit students should look for the following kinds of things:

1. The different kinds of garbage brought to the dump.
2. Is the garbage separated and dumped in different areas or not? Why?
3. Is any garbage burned?
4. Is all the garbage burned?
5. What jobs are necessary? What are the responsibilities of each of these jobs?

TEACHING STRATEGIES

24. It's A Real Dump

ivity students will visit their community's
p, central trash collection site, incinerator,
rash area. They will gain knowledge of how
sposed of in their immediate environment. The
is experience is that the students are able to
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and explain the city operation of garbage
ther in the classroom before or after the
the dump the day of the visit. Set a mutually
date and time for the visit, with an alternate
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visit to be sure everything is still all right.
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to use the words sanitary landfill instead of
cribe it.

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ngs:

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garbage separated and dumped in different
or not? Why?

garbage burned?

the garbage burned?

obs are necessary? What are the respon-
ties of each of these jobs?

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have visited the community garbage dump.
--have participated in a discussion of the experience at the dump.
--have inferred the impact of nonbiodegradable materials on the environment.

MATERIALS	TEACHING STRATEGIES
	6. Where is the dump located in relationship to the community? Is it close to the city or far away from it? Why? 7. Are there any animals and insects living at the dump? What are they? 8. How does the dump look? 9. How does the dump smell? Why? 10. How is our dump like and unlike the one in the film? 11. How much land is a part of the dump? 12. How much land has already been covered or filled at the dump? 13. What land, if any, is available for new garbage dumps? 14. What is done with the garbage that will rot? 15. What is done with the garbage that will not rot? 16. What things did you see that could have been used again rather than thrown away? Have the list of questions dittoed so that the students can refer to them while on the trip. You may wish to have teams assigned to certain questions or have a contest to see who can answer the most questions. The day after the students have been to the dump go over the list on the chalkboard, i.e., garbage jobs, etc., and discuss. Also discuss their experiences, bringing out the items suggested above, stressing the fact that many items that are disposed of do not decompose.

TEACHING STRATEGIES

e is the dump located in relationship to the unity? Is it close to the city or far away it? Why?

there any animals and insects living at the ? What are they?

does the dump look?

does the dump smell? Why?

is our dump like and unlike the one in the film?

much land is a part of the dump?

much land has already been covered or filled e dump?

land, if any, is available for new garbage s?

is done with the garbage that will rot?

is done with the garbage that will not rot?

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er the students have been to the dump go over the chalkboard, i.e., garbage jobs, etc., and lso discuss their experiences, bringing out the sted above, stressing the fact that many items sposed of do not decompose.

ANTICIPATED STUDENT BEHAVIORS

Students:

--infer the impact of nonbiodegradable materials on the environment.

UNIT IV, CORE C
ACTIVITY 4-24: "It's A Real Dump"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ____

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes of preparation each day						
4. Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)				
HIGH INTEREST		→ ______	______	______	______
MODERATE INTEREST					
INDIFFERENCE					
MODERATE RESISTANCE					
STRONG DISLIKE		→ ______	______	______	______
HARD TO RATE					

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
   ☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

needed fragile complicated to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

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12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Were students reluctant to take the "dump" trip?
☐ No ☐ Yes: Comment.

18. Did you encounter any problems arranging or conducting the dump trip?
☐ No ☐ Yes: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C
ACTIVITY 4-24: "It's A Real Dump"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.
☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - c. Realization that certain materials are in finite supply.
    - d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE C OBJECTIVES:

2. Accept the need for recycling materials through his:
    - a. Recognition that certain materials are in finite supply.
    - c. Accomplishment of a recycling task.

MATERIALS

TEACHING STRATEGIES

Activity 4-25. The Recycling Payoff

This activity introduces a rather difficult concept -- recycling. To obtain a working definition of recycling and an appreciation of its good aspects are the main purposes of the activity. Other subtle aspects of recycling may or may not be realized, depending on the readiness and background of your class. Increased understandings that could result from playing the game presented in this activity are as follows:

US FOR THIS ACTIVITY

LS:

Appreciate the cycling relationships of the materials and organisms in the environment through:

c. Realization that certain materials are in finite supply.

d. Recognition of examples of man's impact upon the environment.

Comprehend the role of man as an integral part of nature, not apart from nature.

BJECTIVES:

Accept the need for recycling materials through his:

a. Recognition that certain materials are in finite supply.

c. Accomplishment of a recycling task.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

BSCS

ACTIVITY 4-25. THE RECYCLING PAYOFF

TEACHING STRATEGIES

The Recycling Payoff

introduces a rather difficult concept --
obtain a working definition of recycling
ation of its good aspects are the main
e activity. Other subtle aspects of
or may not be realized, depending on
and background of your class. Increased
that could result from playing the game
his activity are as follows:

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- *--have participated in the* Recycling Payoff *game.*
- *--have developed an understanding of the rules of the game and used them in making wise choices in the game.*
- *--have managed his artificial money successfully and stayed in the game as long as possible.*
- *--have developed a working definition of recycling.*
- *--have developed such other concepts related to recycling as may be appropriate to the background of the class.*

MATERIALS

Game: *Recycling Payoff* (one game set per four students)

TEACHING STRATEGIES

1. *An understanding and a working definition of recycling.*

2. *A realization that some things are in finite supply and that we may exhaust that supply, perhaps because of circumstances we cannot control.*

3. *An understanding of why recycling is frustrating: a) it may be the obvious thing to do, yet may not be possible at certain times and with certain things; b) it costs money and long-range benefits may not be obvious.*

4. *A realization that there is an element of chance in finding new resource supplies and, therefore, man must continually search for new resource locations. The possible resource sites are also finite and therefore, recycling will ultimately be essential.*

5. *A realization that at times money, land and other possessions are worthless if freedom is lost or if they can not be used to secure desired ends.*

The rules of this game are not as complex as they may first appear. To explain them to the class, it will be necessary to use a group of students as an example on day number one. Then the game should be played several times on day two and day three. The game should also be played at later times as requested by the students and/or as seems appropriate to you.

Before the game is started, create interest by allowing students to drill just for fun on the game board. The game board has wooden blocks inside that should be placed in different locations each time the game is played. To accomplish this, the board should be shaken by the banker,

TEACHING STRATEGIES

n understanding and a working definition of
ecycling.

realization that some things are in finite
upply and that we may exhaust that supply,
erhaps because of circumstances we cannot
ontrol.

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has wooden blocks inside that should be placed
t locations each time the game is played. To
this, the board should be shaken by the banker,

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

placed in the middle of four players, and then not moved again until the game is over.

Rules of the Recycling Payoff Game

1. The game can be played by two, three, or four players and a banker.

2. At the start of the game each player receives $500.00 and two drilling rigs.

3. Any method can be used to determine who goes first. After that the player sequence is in a clockwise direction.

4. The banker handles all the money.

5. During the first round of play each player will have to buy land; player can not drill until they own land.

6. At any given turn after the first round a player has three options -- buy land, drill, or recycle -- as outlined below:

   I. Buy Land

      A. Costs $200.00 per plot

      B. Draw card from land card pile after paying banker $200.00. The number on the card corresponds to the plot purchased by the player.

   II. Drill

      A. A player can drill during his turn if he owns a piece of land to drill on and has an available drilling rig with which to drill.

TEACHING STRATEGIES

he middle of four players, and then not
until the game is over.

e Recycling Payoff Game

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rs and a banker.

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. Draw card from land card pile after paying banker $200.00. The number on the card corresponds to the plot purchased by the player.

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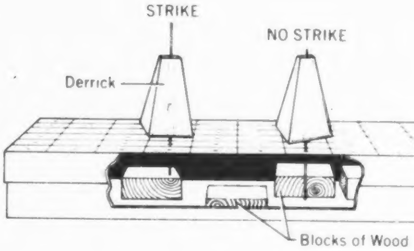
. A player can drill during his turn if he owns a piece of land to drill on and has an available drilling rig with which to drill.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

Diagram 4-9



TEACHING STRATEGIES

B. Drill by placing the derrick over one of the 60 drilling holes on the game board and forcing the derrick stick into the hole. If the stick goes all the way down, a miss results; if it goes only partially down, a strike results.

C. After drilling, follow one of two courses of action.

1. If a strike occurs, (see Diagram 4-9) the player should DRAW A CARD from the strike pile and collect the payoff, as described on the card, from the banker. His turn is then over and the rig is left on the property until a later turn.

2. If the drilling was a miss (see Diagram 4-9) the player can either RECYCLE his rig or SELL his rig to the banker. If he recycles the rig:

    a. The player pays $100.00 to the banker, gets one piece of land, and a chance to drill again during this same turn. If a strike occurs on a recycling drill, the player can again collect by drawing a card from the strike card pile. After recycling once the turn is over.

    b. If the player elects to sell instead of recycle, he turns in his rig to the banker and receives $500.00.

NOTE: There is no way to repurchase a rig in the game once it has been sold to the bank. This is the item in the game that is in finite supply. When you run out (either by choice or force, you can not buy a new one.)

TEACHING STRATEGIES

Drill by placing the derrick over one of the 60 drilling holes on the game board and forcing the derrick stick into the hole. If the stick goes all the way down, a miss results; if it goes only partially down, a strike results.

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a new one.)

ANTICIPATED STUDENT BEHAVIORS

MATERIALS	TEACHING STRATEGIES

III. Recycling

A. A player may use his turn by recycling if he has a rig out in the field that is tied up from a previous strike or recycling miss. On a recycling turn, the player must pay $100.00 to recycle his rig. In addition he gets one piece of property that he can then drill on during that same turn. Once he has recycled during a turn, however, a player may not recycle again during the same time! He must wait for a future time.

7. Playing the game continues until one out of three or two out of four players are out of the game. You are out of the game when you have no drilling rigs to drill with. This will happen when the player has been forced to sell his rigs in order to get money to stay in the game.

8. When two players are out of the game, the banker will pay the players still in the game $1000.00 for each of their remaining rigs and $100.00 for each piece of property not drilled on.

9. The winner will then be determined according to who has the most money.

By design the person who has recycled rigs most often will be the winner. This may not be obvious to students at first, and it may take several playings to bring this out. They will soon catch on to what it takes to stay in the game (i.e., recycle every time you can), and this should be the time that you point out to the students the advantages of recycling materials.

After playing the game several times you might try these questions:

TEACHING STRATEGIES

ecycling

. A player may use his turn by recycling if he has a rig out in the field that is tied up from a previous strike or recycling miss. On a recycling turn, the player must pay $100.00 to recycle his rig. In addition he gets one piece of property that he can then drill on during that same turn. Once he has recycled during a turn, however, a player may not recycle again during the same time! He must wait for a future time.

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ANTICIPATED STUDENT BEHAVIORS

ACTIVITY 4-25

(158)

MATERIALS

TEACHING STRATEGIES

WHAT IS THE BEST WAY TO PLAY IN ORDER TO WIN THIS GAME?

WHAT DOES RECYCLE MEAN IN THIS GAME?

WHAT DOES IT MEAN TO RECYCLE?

WHAT ARE SOME THINGS PEOPLE TRY TO RECYCLE?

WHY DO THEY DO THIS?

HOW DO PEOPLE BENEFIT FROM RECYCLING THINGS?

DOES IT COST MONEY LIKE IT DID IN THE GAME?

THEN WHY DO THEY DO IT?

Then conclude with this statement:

AS A MATTER OF FACT THERE ARE MANY THINGS THAT ARE IN DANGER OF BEING USED UP BECAUSE THERE IS JUST A CERTAIN AMOUNT OF IT. ONCE THAT AMOUNT IS USED THERE WILL BE NO MORE. FOR THOSE MATERIALS, WHAT MUST BE DONE?

THUS THERE ARE THREE REASONS FOR RECYCLING. WHAT ARE THEY?

Complete Tallysheet 4-8.

TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
IS THE BEST WAY TO PLAY IN ORDER TO WIN GAME?	--respond, "Recycle a lot," "Don't sell your drillers," "Cheat."
DOES RECYCLE MEAN IN THIS GAME?	--respond, "Reusing my drillers."
DOES IT MEAN TO RECYCLE?	--respond, "To reuse something."
ARE SOME THINGS PEOPLE TRY TO RECYCLE?	--respond, "Bottles," "Cans."
O THEY DO THIS?	--respond, "Because we will run out," "For money."
O PEOPLE BENEFIT FROM RECYCLING THINGS?	--respond, "Have materials to use over again."
IT COST MONEY LIKE IT DID IN THE GAME?	--respond, "Yes," "No," "May make money."
WHY DO THEY DO IT?	--infer, "Might be necessary," "No other place to get materials."
ude with this statement:	
ATTER OF FACT THERE ARE MANY THINGS THAT ARE NGER OF BEING USED UP BECAUSE THERE IS JUST TAIN AMOUNT OF IT. ONCE THAT AMOUNT IS USED WILL BE NO MORE. FOR THOSE MATERIALS, WHAT E DONE?	--indicate that such finite materials must be recycled if the use of them is to continue.
HERE ARE THREE REASONS FOR RECYCLING. RE THEY?	--indicate an understanding of the rationale for recycling by making statements that mean: -some materials are in finite supply. -it is wise long-term economics to recycle. -it helps alleviate the solid waste disposal problem.
llysheet 4-8.	

Teacher____________________

Date ____________________

UNIT IV, CORE C
TALLYSHEET 4-8: Understandings Obtained from the Recycling Game
ACTIVITY 4-25: "The Recycling Payoff"

Possible understandings which could result from playing the Recycling Game are listed on pages 1 and 2 of the activity and also below. Make a check in the box indicating the number of your students who attained an understanding. List other understandings which you feel they attained as a result of this activity.

1. An understanding of a working definition of recycling.

None 1/4 1/2 3/4 All Comment:

2. A realization that some things are in finite supply.

None 1/4 1/2 3/4 All Comment:

3. A realization that we may totally use up our supply of some things.

None 1/4 1/2 3/4 All Comment:

4. An understanding of why recycling is frustrating:
   (a) it may be the obvious thing to do yet may not be possible at certain times and with certain things

None 1/4 1/2 3/4 All Comment:

(b) it costs money and long-range benefits may not be obvious.

None 1/4 1/2 3/4 All Comment:

5. A realization that there is an element of chance in finding new resource supplies which man continually searches for.

None 1/4 1/2 3/4 All Comment:

2. A realization that some things are in finite supply.

None 1/4 1/2 3/4 All Comment:

3. A realization that we may totally use up our supply of some things.

None 1/4 1/2 3/4 All Comment:

4. An understanding of why recycling is frustrating:
   (a) it may be the obvious thing to do yet may not be possible at certain times and with certain things

None 1/4 1/2 3/4 All Comment:

   (b) it costs money and long-range benefits may not be obvious.

None 1/4 1/2 3/4 All Comment:

5. A realization that there is an element of chance in finding new resource supplies which man continually searches for.

None 1/4 1/2 3/4 All Comment:

6. A realization that at times money, land, and other possessions are worthless if they can not be used to secure desired ends.

None 1/4 1/2 3/4 All Comments:

Other:

UNIT IV, CORE C
ACTIVITY 4-25: "The Recycling Payoff"

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

Activity name suggested by class:

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay. ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	Worksheet #	Worksheet #	Game #	Slides (show slide nos.)	Transparency #	Transparency #	Transparency #	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay. ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

Materials used:	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. What portion of the class realized that to be a winner requires recycling the rig most often? (Circle one) None 1/4 1/2 3/4 all: Comment

18. How many class periods were necessary for students to catch on to the game?
☐ 1 period ☐ 2 periods ☐ 3 periods ☐ More
Comment on difficulties.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

BSCS Evaluation: EMH Feedback Form 1c

UNIT IV, CORE C
ACTIVITY 4-25: "The Recycling Payoff"

Teacher ______________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.
☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

Me and my
Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE C OBJECTIVES:

2. Accept the need for recycling materials through his:
    c. Accomplishment of a recycling task.
3. Exhibit a positive attitude toward microbes that decompose garbage.

MATERIALS

TEACHING STRATEGIES

Activity 4-26. Planting In Compost

This is the first of three actual recycling tasks the student will be asked to perform. In this case the biodegradable materials used in building the class compost will now be used to grow some plants, an illustration of natural recycling. In so doing, the student will further develop the concepts of composting, decomposing, and garbage and gain related knowledge that he may apply to improve his own well-being.

FOCUS FOR THIS ACTIVITY

GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.
   d. Recognition of examples of man's impact upon the environment.
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TEACHING STRATEGIES

-26. Planting In Compost

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BSCS

UNIT IV.	TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT
CORE C.	GARBAGE AND MY ENVIRONMENT
ACTIVITY 4-26.	PLANTING IN COMPOST

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have reviewed his concept of composting, decomposition, garbage, landfill, biodegradable.
--relate decomposition and composting to cycling by planting some seeds and watching plants grow in compost.

ACTIVITY 4-26

(160)

MATERIALS

*Compost piles
*Commercial planting soil
50 Peat pots
*50 Cleaned 1/2 pint milk cartons
*50 Popsicle sticks or pieces of masking tape
*3 Marking pencils
Seeds, 1 package each of:
  Sensitive plants
  Marigolds
  Beans
*Trowels (several)

TEACHING STRATEGIES

Teacher Preparation:

This activity is one of three designed to end Unit IV. It begins with a review of the setting up of the compost pile and what was initially included in the compost. It continues by recalling the observations made and comparing the scavenger and microbe activities related to decomposition and concludes with an activity which practically utilizes the concept of recycling.

Begin by asking:

> WHAT IS COMPOST? SEVERAL WEEKS AGO WE SET UP A COMPOST PILE. WHAT DID WE INCLUDE IN THAT PILE?

List the materials on the chalkboard.

Then say:

> LET'S TAKE ANOTHER LOOK AT THE PILE TO SEE WHAT HAS HAPPENED.

Return Worksheet 4-4 to the students and ask them to look at it.

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TEACHING STRATEGIES

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ANTICIPATED STUDENT BEHAVIORS

Students:

--recall the work done in Activities 4-8 and 4-22 and describe it as biodegradable material that is being decomposed in a pile.

--respond, "Biodegradable things," "Plant stuff," "Lettuce," as well as the nonbiodegradable things: glass, plates, bottle caps, etc.

MATERIALS

TEACHING STRATEGIES

WHAT THINGS HAVE DECOMPOSED OR ARE DECOMPOSING?

HAVE YOU
INVOLVED
ALL
STUDENTS

WHAT WAS THE WORD WE USED TO DESCRIBE THINGS THAT DECOMPOSE IN A SHORT PERIOD OF TIME?

Write the word on the chalkboard, and break it down thus:

Bio = life   degrad = breakdown

Biodegradable = life that is able to break down easily.

WHAT KIND OF LIFE OR LIVING THINGS BREAK DOWN THE BIODEGRADABLE MATERIALS?

ANYTHING ELSE?

THEN WHAT DO SCAVENGERS EAT?

ALL GARBAGE?

WHAT THINGS STILL HAVEN'T DECOMPOSED?

RIGHT, THESE ARE THINGS WHICH THE MICROBES AND SCAVENGERS CANNOT EAT. THESE ARE CALLED NONBIODEGRADABLE AND ARE _____?

NOW LET'S LOOK AT OUR COMPOST PILE AGAIN.

WHAT DOES IT LOOK LIKE?

St

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TEACHING STRATEGIES	ANTICIPATED STUDENT BEHAVIORS
	Students:
THINGS HAVE DECOMPOSED OR ARE DECOMPOSING?	--after inspecting their worksheets and the pile, indicate those things that are undergoing decomposition.
WAS THE WORD WE USED TO DESCRIBE THINGS DECOMPOSE IN A SHORT PERIOD OF TIME?	--respond, "Biodegradable."
word on the chalkboard, and break it down thus:	
fe degrad = breakdown	
dable = life that is able to break down easily.	
KIND OF LIFE OR LIVING THINGS BREAK DOWN IODEGRADABLE MATERIALS?	--respond, "Microbes."
ING ELSE?	--respond, "Scavengers."
WHAT DO SCAVENGERS EAT?	--respond, "Garbage."
ARBAGE?	--respond, "No, only the biodegradable part of the garbage."
THINGS STILL HAVEN'T DECOMPOSED?	--after inspecting their worksheets and the pile indicate, "Plastic," "Glass," "Metal," etc.
, THESE ARE THINGS WHICH THE MICROBES CAVENGERS CANNOT EAT. THESE ARE CALLED ODEGRADABLE AND ARE _____?	--respond, "Metal, rubber, paper, and glass."
ET'S LOOK AT OUR COMPOST PILE AGAIN.	
DOES IT LOOK LIKE?	--respond, "Dirt," "Old garbage," "Soil," "Humus."

HAVE YOU
INVOLVED
ALL
STUDENTS?

ACTIVITY 4-26

(162)

MATERIALS

TEACHING STRATEGIES

WHY DID WE SAY COMPOST PILES WERE BUILT?

NOW WE ARE GOING TO MAKE A MINI OR TINY GARDEN WITH OUR COMPOST.

Note to the Teacher:

It is suggested that each student plant three different kinds of seeds; two seeds of one kind in each peat pot. Each student will then have three pots and three different kinds of plants. If there is compost left over, the rest of the seeds can be planted in the leftover compost. Pass out three peat pots and three cleaned recycled 1/2-pint milk cartons to each student. Have each student fill each pot at least three-fourths full with compost. Use commercial planting soil if there is not enough compost to go around. Then place one pot in each milk carton. As the pot itself decomposes the entire planting will conform to the carton. The carton will also catch any excess water used in keeping the seedlings moist. Also give each student three popsicle sticks or pieces of masking tape to use as labels. It would be best to have at least some compost in each pot supplemented with soil for the rest.

After the pots are filled, the student should carefully plant two seeds of one kind in each pot.

TAKE A POPSICLE STICK OR PENCIL AND MAKE TWO HOLES ABOUT (according to the instructions printed on the seed packets) DEEP IN THE COMPOST IN EACH POT.

NOW YOU PUSH THE SEEDS INTO THE HOLES AND PACK THE COMPOST LOOSELY OVER THE SEEDS. WATER YOUR POTS THOROUGHLY WHEN FINISHED. POUR AWAY ANY WATER THAT HAS SOAKED THROUGH THE POT INTO THE MILK CARTON. MARK A POPSICLE STICK OR MASKING TAPE WITH YOUR NAME AND THE NAME OF THE PLANTS IN THAT POT.

St

--

TEACHING STRATEGIES

D WE SAY COMPOST PILES WERE BUILT?

ARE GOING TO MAKE A MINI OR TINY GARDEN
UR COMPOST.

Teacher:

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(according to the instructions printed on
ed packets) DEEP IN THE COMPOST IN EACH POT.

U PUSH THE SEEDS INTO THE HOLES AND PACK
MPOST LOOSELY OVER THE SEEDS. WATER
OTS THOROUGHLY WHEN FINISHED. POUR AWAY
TER THAT HAS SOAKED THROUGH THE POT INTO
LK CARTON. MARK A POPSICLE STICK OR
G TAPE WITH YOUR NAME AND THE NAME OF THE
IN THAT POT.

ANTICIPATED STUDENT BEHAVIORS

Students:

--respond, "To get rid of garbage," "For gardens."

MATERIALS	TEACHING STRATEGIES
	Then refer back to the earlier activities (Activity 4-2 and 4-19) that deal with cycling and develop and write a line of questioning that will indicate that the student understands that the molecules in the compost are now being recycled. Discuss the use of garbage as a fertilizer. NOTE: On the blank pages following this activity make a copy of the strategy questions you use and the behaviors you observed. Mail this in at the same time as you return the feedback form for this activity. Note To The Teacher. Write the names of the plants on the chalkboard: Marigold Sensitive plant Bean Give the students the option of taking their plants home to keep them or keeping them in the classroom. Be sure to instruct the students to keep the soil moist to the touch. (Make sure that a few are left in the classroom.) One advantage to the peat pots used in this activity is that the student can put the whole pot including the plant in the soil and will not have to transplant the plant. If the student does not plan on planting the pot in his yard, it should be eventually planted in a larger clay pot. The plants planted in the remaining class compost will need to be replanted later.

TEACHING STRATEGIES

ack to the earlier activities (Activity 4-2
at deal with cycling and develop and write a
tioning that will indicate that the student
that the molecules in the compost are now
ed. Discuss the use of garbage as a

e blank pages following this activity make
y of the strategy questions you use and
ehaviors you observed. Mail this in at the
time as you return the feedback form for this
ity.

Teacher.

mes of the plants on the chalkboard:

d
ve plant

dents the option of taking their plants home t
keeping them in the classroom. Be sure to
students to keep the soil moist to the touch.
hat a few are left in the classroom.)

e to the peat pots used in this activity is
dent can put the whole pot including the plant
and will not have to transplant the plant. If
does not plan on planting the pot in his yard,
eventually planted in a larger clay pot.

lanted in the remaining class compost will
eplanted later.

ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE C
ACTIVITY 4-26: "Planting In Compost"

Activity name suggested by class: ____

Teacher ____

BSCS USE: Post ____ Tally ____ Rev ____

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)	
HIGH INTEREST		→ ____ ____ ____ ____
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ____ ____ ____ ____
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

BSCS Evaluation: EMH Feedback Form 1c

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No - Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No - Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Were any difficulties encountered in planting the seeds?
☐ No ☐ Yes: Comment.

18. Concern (or questions) about content:

19. Messages for staff (read immediately):

Have you answered each question, attached **annotated** Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C
ACTIVITY 4-26: "Planting In Compost"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.
☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    - d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

CORE C OBJECTIVES:

2. Accept the need for recycling materials through his.
    - b. Identification of uses for various components of solid waste.
    - c. Accomplishment of a recycling task.

MATERIALS

TEACHING STRATEGIES

Activity 4-27. A Recycling Scavenger Hunt Or Cleanup

Now that students are aware of the problems of garbage disposal, and specifically the problems brought about by nonbiodegradable materials, it would be desirable to involve them in a cleanup and recycling project of their own.

The interest of your students and your ability to stimulate this interest will promote the success of the project.

There are many specific projects from which to select. Some of these, such as collecting cans and bottles, can be used as money-making projects.

OCUS FOR THIS ACTIVITY

OALS:

. Appreciate the cycling relationships of the materials and organisms in the environment through:

  d. Recognition of examples of man's impact upon the environment.

. Comprehend the role of man as an integral part of nature, not apart from nature.

OBJECTIVES:

. Accept the need for recycling materials through his:

  b. Identification of uses for various components of solid waste.

  c. Accomplishment of a recycling task.

TEACHING STRATEGIES

7. A Recycling Scavenger Hunt Or Cleanup

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UNIT IV.	TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT
CORE C.	GARBAGE AND MY ENVIRONMENT
ACTIVITY 4-27.	A RECYCLING SCAVENGER HUNT OR CLEANUP

BSCS

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have participated in a class or individual recycling project.

ACTIVITY 4-27

MATERIALS

TEACHING STRATEGIES

The project you select should be conducted periodically for the remainder of the year. If it is a money-making project, students should be allowed to decide how the money will be used.

You are the key factor in generating and keeping interest in the project, so be enthusiastic.

Once students have started on a project, you might ask why the word scavenger was used when you named the project "A Recycling Scavenger Hunt."

Following are suggested activities. Feel free to participate in any activities you may know of whether or not they are listed. Students may also have suggestions. You may find it expeditious to work in cooperation with any civic groups that already have initiated such projects. Groups that have been involved in the past are the YMCA, Kiwanis, J.C.'s, as well as local environmental groups.

Suggested Projects

1. Collecting aluminum cans.
2. Collecting glass bottles.
3. Collecting scrap metal.
4. Collecting newspapers.
5. Cleaning up the school grounds.
6. Cleaning up vacant yards.
7. Cleaning public grounds and parks.
8. Cleaning water shorelines.
9. Keeping a stretch of roadway or hiking trails litter free through a periodic patrol.

Be creative and enthusiastic!

Keep a record of the amounts of things collected and continue to stress the benefits of such endeavors, especially since they directly influence the student as a creature in his natural environment.

TEACHING STRATEGIES

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ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE C

ACTIVITY 4-27: "A Recycling Scavenger Hunt Or Cleanup"

Teacher

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: Name students you noted especially:

	(Number)
HIGH INTEREST	
MODERATE INTEREST	
INDIFFERENCE	
MODERATE RESISTANCE	
STRONG DISLIKE	
HARD TO RATE	

→ ________ ________ ________ ________

→ ________ ________ ________ ________

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet #	#	#	Game #	Slides (show slide nos.)	Transparency #	#	#	Card(s) #	Tape(s) #	Other #
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:

☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

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12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:

☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed. What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. What factors led to the success or failure of the project?

18. Did each student participate in the recycling project?
☐ Yes ☐ No: If not, which ones and why not?

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C

ACTIVITY 4-27: "A Recycling Scavenger Hunt Or Cleanup"

Teacher ______________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.
☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:

   d. Recognition of examples of man's impact upon the environment.

CORE C OBJECTIVES:

2. Accept the need for recycling materials through his:

   b. Identification of uses for various components of solid waste.

   c. Accomplishment of a recycling task.

MATERIALS	TEACHING STRATEGIES

Activity 4-28. Me, Recycling, And Art

This last of three recycling activities should allow students the opportunity to create something useful or artistic from recycled materials. It is a very practical and concrete way of ending the unit.

Tell the students that they may now make something of their choice from recycled materials. The only limits are that they must provide the recycled materials themselves and that the materials must be truly recycled. You will provide as many of the tools and working materials as possible, but encourage students to bring in their own tools to work with also. Contact the art, industrial arts, and home economics instructors for ideas and assistance if need be.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

ACTIVITY 4-28. ME, RECYCLING, AND ART

BSCS

US FOR THIS ACTIVITY

LS:

Appreciate the cycling relationships of the
materials and organisms in the environment
through:

d. Recognition of examples of man's impact
upon the environment.

BJECTIVES:

Accept the need for recycling materials
through his:

b. Identification of uses for various
components of solid waste.

c. Accomplishment of a recycling task.

TEACHING STRATEGIES

. Me, Recycling, And Art

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opportunity to create something useful
rom recycled materials. It is a very
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at the materials must be truly recycled.
ide as many of the tools and working
possible, but encourage students to bring in
ls to work with also. Contact the art,
ts, and home economics instructors for ideas
e if need be.

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

--have collected recycled materials of his choice for incorporation into an artistic or useful object.

--have completed the construction of his recycled art or utilitarian form.

ACTIVITY 4-28

MATERIALS

TEACHING STRATEGIES

Allow the students as much freedom as possible, and provide assistance only when necessary or requested. Remember the success your students had in constructing space ships from styrofoam cups.

Following are some projects suggested by your colleagues.

1. Christmas tree decorations made from old light bulbs, popsicle sticks, tin can covers, gum wrapper or newspaper chains.
2. Ash trays or coasters from tin cans.
3. Waste baskets from circular cardboard or metal drums.
4. Terrariums from old bottles.
5. Swings from old tires.
6. Pencil holders from old tin cans.
7. Window decorations or grouted hot pads from tumbled bits of colored glass.
8. Doll furniture from lumber scraps.

Have students take pictures of their creations. If you have plenty of film, each student could be photographed with his work. It may be necessary, however, for students to photograph several objects at a time to conserve film. Identify each object and who made it on the back of each picture. Also identify who took the picture.

TEACHING STRATEGIES

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sistance only when necessary or requested.
he success your students had in constructing
s from styrofoam cups.

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s, popsicle sticks, tin can covers, gum
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Also identify who took the picture.

ANTICIPATED STUDENT BEHAVIORS

UNIT IV, CORE C
ACTIVITY 4-28: "Me, Recycling, And Art"

Activity name suggested by class:

Teacher
BSCS USE: Post ____ Tally ____ Rev ___

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes of preparation each day						
4.	Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: (Number) | Name students you noted especially:

	(Number)	Name students you noted especially:
HIGH INTEREST		→ ________ ________ ________ ________
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ________ ________ ________ ________
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

BSCS Evaluation: **EMH Feedback Form 1c**

Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Was there much variety in the items brought for recycling?
☐ Yes ☐ No: Comment.

18. How much supervision did students require during construction of the art form?
☐ Little ☐ Moderate ☐ Much: Comment.

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C

ACTIVITY 4-28: "Me, Recycling, And Art"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

- ☐ how you organized materials or class.
- ☐ things added (a question, a picture, etc.).
- ☐ equipment, supplies, visual aids.
- ☐ things that went wrong, misunderstandings.
- ☐ what you would do differently or avoid next time.

THE STUDENTS

- ☐ who had problems and what they were.
- ☐ how someone "caught on" (or who never did).
- ☐ who was really "turned off" (or on).
- ☐ reactions of parents, teachers, students.
- ☐ special evidence of learning or applying ideas.

- ☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

Me and my Environment

OBJECTIVE FOCUS FOR THIS ACTIVITY

UNIT GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
   a. Understanding of what a cycle is.
   b. Understanding of the role of decomposers.
   c. Realization that certain materials are in finite supply.
   d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part _of_ nature, not apart _from_ nature.

CORE C OBJECTIVES:

1. Perceive that garbage (solid waste) is a man-made problem through his:
   a. Understanding of the concept of biodegradable and nonbiodegradable.
   b. Realization that satisfactory solid waste disposal is difficult.
   c. Description of daily garbage.
2. Accept the need for recycling materials through his:
   a. Recognition that certain materials are in finite supply.
   b. Identification of uses for various components of solid waste.
   c. Accomplishment of a recycling task.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

ACTIVITY 4-29. REVIEW OF SUCCESS

BSCS

FOCUS FOR THIS ACTIVITY

GOALS:

1. Appreciate the cycling relationships of the materials and organisms in the environment through:
    a. Understanding of what a cycle is.
    b. Understanding of the role of decomposers.
    c. Realization that certain materials are in finite supply.
    d. Recognition of examples of man's impact upon the environment.
2. Comprehend the role of man as an integral part of nature, not apart from nature.

C OBJECTIVES:

1. Perceive that garbage (solid waste) is a man-made problem through his:
    a. Understanding of the concept of biodegradable and nonbiodegradable.
    b. Realization that satisfactory solid waste disposal is difficult.
    c. Description of daily garbage.
2. Accept the need for recycling materials through his:
    a. Recognition that certain materials are in finite supply.
    b. Identification of uses for various components of solid waste.
    c. Accomplishment of a recycling task.

CORE C OBJECTIVES (continued):

3. Exhibit a positive attitude towards microbes that decompose garbage.

MATERIALS

TEACHING STRATEGIES

Activity 4-29. Review Of Success

In this activity the students are given the opportunity to express their attitudes about recycling and garbage. Two worksheets and four slides serve as a stimulus for discussion.

DISTRIBUTE MAT

Part I.

Worksheet 4-11

Slide 4-33

1. WHICH OF THE FOLLOWING WILL DECOMPOSE MOST EASILY WHEN THROWN AWAY?

MARK AN X ON YOUR CHOICE.

Distribute Worksheet 4-11 and have each student write his name on it.

Project each question, Slides 4-33 through 4-36, separately. Read question one and answer choices aloud to the students. Allow ample time for them to mark their worksheets. Repeat this procedure for the next three questions.

C OBJECTIVES (continued):

3. Exhibit a positive attitude towards microbes
   that decompose garbage.

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

BSCS

ACTIVITY 4-29. REVIEW OF SUCCESS

TEACHING STRATEGIES

-29. Review Of Success

tivity the students are given the opportunity to
eir attitudes about recycling and garbage.
eets and four slides serve as a stimulus for
.

DISTRIBUTE MATERIALS

Worksheet 4-11 and have each student write his
.

ch question, Slides 4-33 through 4-36, sepa-
ead question one and answer choices aloud to
ts. Allow ample time for them to mark their
. Repeat this procedure for the next three

ANTICIPATED STUDENT BEHAVIORS

At the end of this activity, each student should:

- *--have expressed his attitudes towards garbage and recycling by completing Worksheets 4-11 and 4-12.*
- *--be able to defend his answers to the tasks assigned in Worksheets 4-11 and 4-12.*

--should recognize the moccasin as the only biodegradable material and mark picture C with an X.

--should recognize that all the choices contribute to the garbage problem and so mark.

MATERIALS

Slide 4-34

Slide 4-35

Slide 4-36

TEACHING STRATEGIES

After all students have had the opportunity to answer all of the questions, collect the worksheets. Then project each slide and discuss the answers with them. Have them defend their choices. Since questions 2, 3, and 4 assess attitude as much as anything else, the student should be given due credit for defending his answer in a logical manner. Allow them to challenge one another. The discussion will give you insight as to which points still need to be stressed.

INVOLVE YO
SLOWEST
STUDENTS

After the class tally the students' answers on Tallysheet 4-9. Consider whether the whole class needs further review or if a few individuals need special attention.

TEACHING STRATEGIES

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stions, collect the worksheets. Then project
and discuss the answers with them. Have them
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llow them to challenge one another. The
will give you insight as to which points still
stressed.

INVOLVE YOUR
SLOWEST
STUDENTS

class tally the students' answers on Tallysheet
ider whether the whole class needs further
if a few individuals need special attention.

ANTICIPATED STUDENT BEHAVIORS

Students:

--should have modified their initial attitude of "dirty" and "dangerous" when applied to decomposer microbes. An indication of this attitude change is the student's marking of choice B, helpful.

--most likely will choose either A or B. Whereas throwing a bottle into the trash is far more suitable than tossing it out of a car or smashing it against rocks, the preferred response is recycling. Hence, choice [illegible] is the best thing for the environment.

ACTIVITY 4-29

⑰②

MATERIALS

Worksheet 4-12

TEACHING STRATEGIES

Part II.

Distribute Worksheet 4-12 and have each student write his name and the date on it. Read the question and explain what is to be done. Let the students interpret the four pictures themselves, however.

Give the students a choice of how they wish to complete the story on their own. Have both a tape recorder and a camera available for those students who wish to use those mediums.

Fill in Tallysheet 4-10 applying to Worksheet 4-12. Send in both tallysheets.

Select the cleverest or most interesting student Worksheet 4-12 stories and send in with their ending.

St

--

TEACHING STRATEGIES

rksheet 4-12 and have each student write his
date on it. Read the question and explain
done. Let the students interpret the four
selves, however.

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their own. Have both a tape recorder and a
ble for those students who wish to use those

sheet 4-10 applying to Worksheet 4-12.
tallysheets.

sverest or most interesting student
2 stories and send in with their ending.

ANTICIPATED STUDENT BEHAVIORS

Students:

--may complete the story with any number of intermediate steps, but the final one should indicate a recycling use such as: returning it to a recycling center, using it to make papier-mâché, shredding it for packing materials, etc.

Teacher ______________________
Date ______________________

UNIT IV, CORE C
TALLYSHEET 4-9: Summary of Worksheet 4-11
ACTIVITY 4-29: "Review Of Success"

Circle each student's answers to Worksheet 4-11 on the tallysheet below. In the columns for totals, write down the number of students who circled each letter.

		1 (Moccasin)	2 (Garbage Problem)	3 (Microbes)	4 (Recycling)
	KEY:	A B [✓ C] D	[✓ A] [✓ B] [✓ C] [✓ D] [✓ E] [✓ F] [✓ G]	A [✓ B] C D	A [✓ B] C D
Attach ID list here.	01	A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B. C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D
		A B C D	A B C D E F G	A B C D	A B C D

	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
	A B C D	A B C D E F G	A B C D	A B C D
TOTALS:	____ ____ ____ ____	__ __ __ __ __ __ __	____ ____ ____ ____	____ ____ ____ ____

Does this review give an accurate indication of student understanding? ☐ Yes ☐ No
If not, what other evidence do you have of student learning?

Teacher ____________________

Date ____________________

UNIT IV, CORE C

TALLYSHEET 4-10: Summary of Worksheet 4-12

ACTIVITY 4-29: "Review Of Success"

Category 1. For each student circle the appropriate word to indicate whether the student's story included a recycling use.

Category 2. For each student check Finished if he finished the task of story completion or Inc. if his work is not completed.

Category 3. For each student check the appropriate column or columns to indicate the medium used to complete the story. Write in other ways students expressed their stories under "Other."

		Category 1:	Category 2		Category 3: Medium Used			
		Recycling Use	Finished	Inc.	Written	Tape	Snapshot	Other (explain)
Attach ID list here.	01	Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						
		Yes No						

	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					
	Yes No					

What is your opinion of the value and difficulty of this task for your students?

UNIT IV, CORE C
ACTIVITY 4-29: "Review Of Success"

Teacher
Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ___

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes of preparation each day						
4. Students absent on each date (Use ID Number)						

5. Interest of class as expressed by apparent attention to what is happening.

Number of students responding with: (Number) Name students you noted especially:

	(Number)	Name students you noted especially:
HIGH INTEREST		→ ______ ______ ______ ______
MODERATE INTEREST		
INDIFFERENCE		
MODERATE RESISTANCE		
STRONG DISLIKE		→ ______ ______ ______ ______
HARD TO RATE		

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

Materials used:	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

6. Equipment in kit: ☐ None needed ☐ Satisfactory ☐ Too fragile ☐ Too complicated ☐ Difficult to use

7. Equipment I got: ☐ None needed ☐ Easy to get ☐ Hard to get, but okay ☐ Hard to get, add to kit ☐ Unobtainable, add to kit

8. Materials used:

	Worksheet			Game	Slides (show slide nos.)	Transparency			Card(s)	Tape(s)	Other
	#	#	#	#		#	#	#	#	#	#
Worthwhile as is											
Revise slightly											
Revise much											
Worthless: omit											

9. Maturity level is ☐ just right ☐ too childish ☐ too mature Explain:

10. Vocabulary level is ☐ just right ☐ too easy ☐ too difficult Explain:

11. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -Pages and Problem:

12. Were clues to success and reviews of success helpful? ☐ Yes ☐ No -Why not?

13. Did the activity fulfill the purpose stated by the Guide? ☐ Yes ☐ No - Comment:

14. Were any parts of this activity omitted? ☐ No ☐ Yes - Explain:

15. Your rating of this activity:
☐ Worthwhile --keep as is ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it

SPECIFIC CONCERNS ABOUT THIS ACTIVITY:

16. There are always parts of activities that are good and need not be changed.
What parts of this activity should be retained when the curriculum is revised?
Page(s) ____________________:

17. Did any student give away any answers to Worksheet 4-11?
☐ No ☐ Yes: Comment.

18. Were any students unable to complete Worksheet 4-12?
☐ No ☐ Yes: Who and why?

19. Concern (or questions) about content:

20. Messages for staff (read immediately):

BSCS Evaluation: EMH Feedback Form 1c

Have you answered each question, attached annotated Guide, your revisions, student work, etc.?

SIDE A

UNIT IV, CORE C
ACTIVITY 4-29: "Review Of Success"

Teacher ________________

REPORT OF WHAT HAPPENED AND SUGGESTIONS FOR REVISION

1. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide in with this form.
2. Make specific suggestions - exactly what you think should appear in the Guide.
3. Tell us what you did. Think of what you needed, what you had to work out for yourself, how you presented something to make it go over.
4. Describe the revisions you said were needed in answering the questions on the other side of this form.
5. As a reminder of things that help in revision, read through the following list and check off things you want to be sure to note this time. (We know you can't tell about everything every time!)

THE LESSON

☐ how you organized materials or class.
☐ things added (a question, a picture, etc.).
☐ equipment, supplies, visual aids.
☐ things that went wrong, misunderstandings.
☐ what you would do differently or avoid next time.

THE STUDENTS

☐ who had problems and what they were.
☐ how someone "caught on" (or who never did).
☐ who was really "turned off" (or on).
☐ reactions of parents, teachers, students.
☐ special evidence of learning or applying ideas.

☐ turmoil in the class caused by the activity, or disruptive students, or interruptions, and how you dealt with them.

UNIT IV
REACTIONS TO CORE C

1. Was the background information for this core adequate? ☐ Yes ☐ No
Comment:

2. Was it clear to you why these particular activities were chosen and the direction they were leading? ☐ Yes ☐ No
Comment:

3. Did the activities fulfill the purposes stated in the Guide for this core? ☐ Yes ☐ No
Comment:

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities? ☐ Yes ☐ No
6. If yes, what do you see as the "take-home" lesson? If no, what is needed?

7. In these materials, what things did your students find difficult to do?

8. Should there be more clues to success or reviews of success in this core? ☐ Yes ☐ No
Comment:

9. Was there too much reading and too many teacher directions? ☐ Yes ☐ No
Comment:

10. Did you make use of the Planning Guide? ☐ Yes ☐ No
Comment:

BSCS Evaluation: EMH Feedback Form 2a

5. Is there a practical (take-home) value for your students in these activities? ☐ Yes ☐ No
6. If yes, what do you see as the "take-home" lesson? If no, what is needed?

7. In these materials, what things did your students find difficult to do?

8. Should there be more clues to success or reviews of success in this core? ☐ Yes ☐ No
Comment:

9. Was there too much reading and too many teacher directions? ☐ Yes ☐ No
Comment:

10. Did you make use of the Planning Guide? ☐ Yes ☐ No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

12. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain.

SIDE A

NEW STUDENTS ENTERING DURING THIS CORE

Date Entered	Last Name Name Used	Ethnic Group	Sex	Birthdate	Test date	Test	Tota
		W B S O	M F			W B O	
		W B S O	M F			W B O	
		W B S O	M F			W B O	
		W B S O	M F			W B O	

W = white
B = black
S = Spanish-American
O = other

W = WISC
B = Binet
O = other (name)

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name First

ADDITIONAL INFORMATION ON NEW STUDENTS:

NEW STUDENTS ENTERING DURING THIS CORE

up	Sex	Birthdate	Test date	Test	Total	Verbal	Performance	Previous Test Score
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				

W = WISC
B = Binet
O = other
(name)

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an